

RAILROAD GAZETTE

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CHICAGO, SATURDAY, APRIL 9, 1870.

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IN ADVANCE.

THE COTTER CAR COUPLING.

Letters patent for a self-connecting and self-disconnecting car-coupling and friction bumper were lately issued to the Cotter Car Coupling Company, of Saginaw, Michigan. The accompanying engravings represent the device, both in a coupled and uncoupled attitude, so accurately that a very brief description will suffice for understanding its working and application.

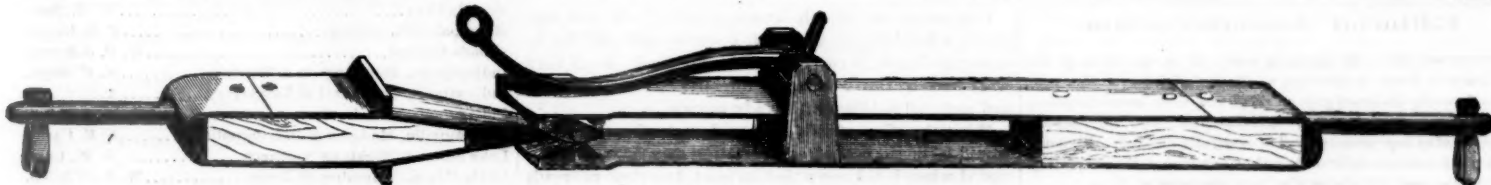
A A are shanks which pass through and are firmly connected with the springs or rubbers. B B are two jaws made from 4 in. by $\frac{1}{2}$ in. spring steel and usually about two feet in length. C serves as a guide clasp

ed in Maine. Tests will be made of some red Missouri granite, which the engineers hope to be able to use. The smaller shafts of the east pier are being filled with concrete. There has been a strike among men working in the air chamber. They had been getting \$4 per day for six hours work, but wanted \$5 for four hours. The dangerous character of the work makes it necessary to pay high prices.

J. S. Morgan & Co., bankers, of London, successors of Peabody & Coy, have purchased \$2,500,000 of the company's bonds, with the option for 30 days of taking the remaining \$1,500,000. The amount received for these bonds, together with \$1,200,000 subscribed by stock-

IRON RAIL FROG.	
400 lbs. Iron Rail @ 4 c.	\$ 16 00
75 lbs. Plate @ 5 1/2 c.	4 15
3 lbs. Rivets @ 9 c.	27
6 lbs. Bolt Iron @ 4 c.	24
Labor	6 15
Coal	50
Wear and Tear of Machinery	50
Total	\$ 27 79

CAST IRON PLATED FROG.	
705 lbs. Cast Iron @ 4 c.	\$28 20
110 lbs. Steel @ 11 c.	12 10
30 lbs. Rivets @ 13 c.	3 90
Labor	6 75
Coal and wear and tear of machinery	1 00
1st cost	\$50 95
Re-plating twice	44 00
Total	\$94 95



The Cotter Car Coupling in a Coupled Attitude.

about the jaws and also as a support for the pivoted cam-lever, D. The oval arrow head, E, is so formed as to press apart the spring jaws and form a perfect coupling when the cars come together, and in this position it bears upon the shoulders, F F, which stand $\frac{1}{2}$ inch in prominence. The friction inclines, G G, tend to diminish the force of the blow upon the bumpers H H.

By raising the lever, D, to the position shown in the second engraving, uncoupling is effected; the barbs of the arrow-head, being thrown free from the jaw by the shoulders, F F.

It is claimed for this coupling that, while it is perfectly secure while the cars are in their proper place, either on a straight track or on a curve, the cars will be instantly disconnected in case of an accident of almost any form. It will be observed that the mouth of the jaw is about twice the width of the surface of the rail, so that, in case a car jumps the track directly side-wise, the arrow-head is forced out and the car is released the instant the flange of the wheel passes to the outside of the rail. If a wheel or axle breaks and the car careens, the coupling revolves and the arrow-head wrings loose. A case can hardly be conceived of in which, with this attachment, an engine or one car can drag another from the track.

A cord may be attached to the loop in the cam-lever of the coupling connecting the train with the engine and may pass the entire length of train, so that the conductor can, when necessary, detach the train as readily as he can pull the signal cord.

This coupling also overcomes the necessity of the

holders, will be sufficient to complete the work. The sale of bonds assures the completion of the bridge.

The contract for the entire superstructure has been let to the Keystone Bridge Company of Pittsburgh, which agrees to complete it for \$1,500,000, which is within the engineers' estimates. The company is to finish it by the 1st of October, 1871. Capt. James B. Eads, who designed the bridge, will have general charge of its construction.

RAILWAY FROGS.

[This paper was prepared by John E. Blunt, Civil Engineer of the Galena Division of the Chicago & Northwestern Railway, and read by him before the Engineers' Club of the Northwest].

Next to securing a good rail a durable and simple railway frog is an important desideratum in the "maintenance of way." The present paper is not intended to treat of frogs in general, or detract from the merits of any frog in particular, but merely to give the result of a few years experience on the Galena Division of the Chicago & Northwestern Railway, with this essential component of a railway track.

We will first consider the cost of the different

MANFIELD FROG.	
Cost	\$105 00
PARKER FROG.	
Pat. 1866	\$115 00
Re-bolting	5 00
Total	\$120 00

WHERE TESTED.

For convenience of illustration, we will designate by numbers the places at which the frogs were tested.

Location No. 1 is at a point over which pass all the passenger trains of the division, as well as those of the Chicago, Columbus & Indiana Central, together with all the freight trains arriving and departing over Kinzie street tracks, most of which are "made up" over this frog. No. 2 receives $\frac{1}{2}$ and No. 3 $\frac{1}{2}$ as much wear as No. 1.

TESTS.

LOCATION NO. 1.

A Cast Plated Frog required re-plating after six months' use, and as but few will outlast the third plating, it is fair to estimate the utility of a cast frog at fifteen months.

An Iron Rail Frog was only fit for the rolling mill after three months' service.

A Steel Rail Frog was put in August 1, 1867, taken out November 15, 1869, and re-riveted at a cost of five dollars, the rails and plates showing but little wear; and from present appearances will last at least fifteen months longer.

LOCATION NO. 2.

A Parker Frog was placed in position No. 2 November 2d, 1868, taken out October 29th, 1869, with the bolts



The Cotter Car Coupling in an Uncoupled Attitude.

"crooked link" where cars are of different heights, since the mouth of the jaw section may be made flaring to an extent of ten or more inches, if desired.

Rights for use, or any further information may be obtained by addressing the Cotter Car Coupling Company, Saginaw, Michigan.

The St. Louis Bridge.

We condense and select the following from the St. Louis Republican of the 3d inst:

The west pier of the bridge was grounded on the rock on the 1st inst, 78 feet from the surface of the river. The masonry will be laid as soon as a sufficient supply of granite is obtained. This granite comes from Richmond, Va., by way of New Orleans. The delay is for lack of transportation. Some granite will be obtain-

kinds of frogs used, their location, when tested, and finally their durability and relative cost.

In estimating the cost, a common length of 6 feet 8 inches has been taken, and all the cost of labor and material used is embraced in this length, the extra amount of rail required in the rail frog being reckoned as so much track.

THE COST OF FROGS.

STEEL RAIL FROG.	
400 lbs. Steel Rail @ 6 c.	\$ 24 00
75 lbs. Plate @ 5 1/2 c.	4 15
3 lbs. Rivets @ 9 c.	27
6 lbs. Bolt Iron @ 4 c.	24
Labor	12 30
Coal	1 00
Wear and Tear of Machinery	1 00
First cost	\$ 42 94
Re-riveting	5 00
Total	\$ 47 94

broken, and the steel wings and point considerably worn; will last about eight months after re-bolting, and is good in location No. 1 fifteen months.

LOCATION NO. 3.

A Mansfield Frog was put in May 7th, 1867, and taken out November 23d, 1869, completely worn out. Its duration in place No. 1 would be about twenty months.

SUMMARY.

Using the foregoing data as a basis, we arrive at the following relative cost of each kind of frog, not taking into account the interest on cost or the value of scrap.

Steel Rail Frog	\$1 00
Iron Rail Frog	8 11
Cast Plated Frog	5 54
Mansfield Frog	4 56
Parker Frog	6 35

—Boats left St. Louis last week for Fort Benton, Montana, and for Dubuque, Iowa.



PUBLISHED EVERY SATURDAY.

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Editorial Announcements.

Correspondence.—We cordially invite the co-operation of the Railroad Public in affording us the material for a thorough and worthy Railroad paper. Railroad news, annual reports, notices of appointments, resignations, etc., and information concerning improvements will be gratefully received. We make it our business to inform the public concerning the progress of new lines, and are always glad to receive news of them.

Articles.—We desire articles relating to railroads, and, if acceptable, will pay liberally for them. Articles concerning railroad management, engineering, rolling stock and machinery, by men practically acquainted with these subjects, are especially desired.

Inventions.—Those who wish to make their inventions known to railroad men can have them fully described in the RAILROAD GAZETTE, if not previously published, FREE OF CHARGE. They are invited to send us drawings or models and specifications. When engravings are necessary the inventor is expected to furnish his own engravings or to pay for them.

Our Prospectus and Business Notices will be found on the last page.

HONESTY IN RAILROAD MANAGEMENT.

Of late years certain questionable practices of prominent—or notorious—railroad financiers have become so common, that, no doubt, many will question the existence of honesty in railroad management. We will not quarrel with such persons here, though we might justly show that their condemnation is founded on exceptional and not universal practice. We are content here, however, to affirm the existence of honesty without attempting to demonstrate it, but call attention particularly to the importance to the community of honesty in railroad management, and the interest which the public has in making active exertions to secure such honesty.

It is pretty generally understood now that the man who subscribes money to build a railroad has no assurance that the property in which he has invested will be administered for his interests, even though he may have a majority of the company's shares. Examples are not uncommon where officers chosen to represent the stockholders have used their power solely for their individual benefit. They have subsidized Legislatures and courts, continued themselves in control after the terms for which they were elected had expired, lessened the value of the proprietors' shares by large additional issues of stock, made appointments of personal friends to places of trust and emolument in the operating departments, to the utter neglect of efficiency and economy, and, in general, done what they could to justify the belief that in this country grand larceny is legitimate when committed by railroad managers on the property of stockholders.

That the instances of such conduct are few is very true; that the infamy of such conduct is charged upon railroad management quite generally, is no less true.

Just here we wish to inquire into the effect of the reputation which a few eminent instances of rascality have gained for American railroad management.

One very important effect, especially in the West, is a lack of capital for building railroads. There are immense territories of fertile land waiting for occupants and millions of industrious men waiting to occupy them. Lands and men are kept apart by the lack of facilities for transportation. It is not generally understood that districts of cheap, fertile and easily accessible land in the

United States are now, comparatively, few and small. As soon as one is entered by a railroad, swarms of immigrants flock to it, as they are now flocking to Southeastern Kansas. More than ever before railroads are indispensable to the settlement of our Western Territories.

Not only is this so, but for most of the territory still unoccupied it is necessary that transportation should be cheap. Products which are profitable a thousand miles from the consumer will not pay the cost of transportation a thousand miles farther away. Twenty million bushels of wheat might be produced annually in Colorado, but the cost of transporting it even to the Mississippi river would be more than its value in the New York market. The cheap transportation is necessary to the rapid settlement of the territory. Cheap transportation can only be secured by railroads which have but a small interest to pay on capital invested.

There are hundred of millions of dollars which would be readily invested in American railroads if the capitalists felt sure that they could maintain control of their property, have it managed fairly for their and the public interest, and expect with confidence six per cent. interest regularly. But when they have, or think they have, good reason to believe that their property will be mismanaged, taken from their control, or virtually stolen, most of them decline all such investments, while the more venturesome invest only where a prospect of two, three, or four times the interest induces them to assume the risks.

It is safe to say that the average cost of our new railroads, when built by wholesale contract and paid for by mortgage bonds, is twice as much as it would be if they were built by the companies directly and all the work and material paid for with ready money.

What the effect of this decreased cost of construction would be on the cost of transportation may be easily estimated when it is known that on most American railroads the expenditures for interest on capital are from two-fifths to one-half of the entire annual expenditures.

The community, as law-makers, are at fault in this matter. Proper general laws and the prohibition of all special laws would make railroad managers responsible to the stockholders. A law securing a representation of minorities in boards of directors would tend to prevent any secret proceedings prejudicial to the interests of a part of the stockholders, and to ensure integrity and honesty of management; and a disposition shown by the public not to violate the rights of railroad proprietors, while holding them firmly to their duties, will go far to inspire confidence in those on whom they must depend to provide means of transportation.

A New Working Organization.

The old Little Miami, Columbus & Xenia road was delivered on the 1st inst. to the lessee, the Pittsburgh, Cincinnati & St. Louis Company, which has now so many leased lines (with the company's own road about 1,100 miles) that its operating department is one of the most important on the Continent. To take a new line and organize the operating force so as to work harmoniously and economically in new relations is a difficult and often a delicate task.

The Pittsburgh, Cincinnati & St. Louis Company announced a general change in the working organization on taking possession of the Little Miami. John Durand, the late Superintendent of the Little Miami road, became General Superintendent of the Pittsburgh, Cincinnati & St. Louis Railroad, thus controlling the whole system of lines from Pittsburgh to Cincinnati, Indianapolis and Chicago. D. W. Colwell, last Assistant General Manager of the Pittsburgh, Cincinnati & St. Louis, is made General Superintendent of the Indianapolis and Chicago Division, which embraces the whole of the Columbus, Chicago & Indiana Central, and, we believe, the short lines which connect that road with the old Little Miami. A. J. McDowell is announced as Comptroller of the Pittsburgh, Cincinnati & St. Louis, instead of Auditor as heretofore. George D. Whitcomb remains Purchasing Agent. Wm. L. O'Brien, General Ticket Agent of the Little Miami, becomes General Passenger and Ticket Agent of the Pittsburgh, Cincinnati & St. Louis. C. W. Smith is appointed Freight Agent of the whole system of lines, being promoted from the same office in the Columbus, Chicago & Indiana Central. Hon. J. R. Suran is Solicitor.

—Sidney Dillon, who built a large part of the Union Pacific, has a claim for \$988,000 against the Boston, Hartford & Erie Railroad, and has had the sheriff levy on that part of the road in Dutchess county.

—The Illinois & Michigan Canal was opened for navigation, from LaSalle to Lockport, on Tuesday, the 5th, and from Bridgeport to Lockport on Thursday, the 7th instant.

GENERAL TICKET AGENTS' ASSOCIATION.

The annual convention of this association commenced its session at the Fifth Avenue Hotel, New York, March 30, 1870. It was called to order by the Vice President, S. F. Pierson, of the Cleveland, Columbus, Cincinnati & Indianapolis Railroad.

J. W. Cary, D. M. Boyd, Jr., and W. H. King were appointed a Committee on Credentials. They reported the following members in attendance, representing the roads opposite their names:

Alabama & Chattanooga.....	W. C. Thompson.
Albany & Susquehanna.....	S. E. Mayo.
Allentown Line.....	H. P. Baldwin.
Atlantic & Great Western.....	John N. Abbott.
Atlantic & Gulf.....	C. D. Owens.
Baltimore & Ohio.....	L. M. Cole.
Belvidere, Delaware & Flemington.....	A. C. Davis.
Boston & Albany.....	J. M. Griggs.
Burlington & Missouri River.....	A. E. Touzalin.
Camden & Amboy.....	J. W. Gore.
Central Branch, Union Pacific.....	T. M. Sother.
Central & Southwestern of Georgia.....	G. J. Foreacre.
Charlotte, Columbia & Augusta.....	E. R. Dorsey.
Chicago, Burlington & Quincy.....	Samuel Powell.
Chicago & Northwestern.....	H. P. Stanwood.
Chicago, Rock Island & Pacific.....	E. St. John.
Cincinnati, Hamilton & Dayton.....	Samuel Stevenson.
Cincinnati & Indianapolis Junction.....	J. A. Semple.
Cleveland, Columbus, Cincinnati & Indianapolis.....	S. F. Pierson.
Connecticut River.....	W. J. Phelps.
East Tennessee, Virginia & Georgia.....	Jas. R. Ogden.
Erie Railway.....	W. R. Barr.
Hannibal & St. Joseph.....	P. B. Groat.
Illinois Central.....	W. P. Johnson.
Indianapolis, Bloomington & Western.....	N. E. Scott.
Indianapolis, Cincinnati & Lafayette.....	A. E. Clark.
Indianapolis & St. Louis.....	John S. Garland.
Jeffersonville, Madison & Indianapolis.....	S. E. Carey.
Lake Shore & Michigan Southern.....	J. W. Cary.
Little Miami, Columbus & Xenia.....	W. L. O'Brien.
Louisville & Cincinnati Short Line.....	Henry Steffee.
Louisville & Nashville.....	W. H. King.
Marietta & Cincinnati.....	John Pillsbury.
Memphis & Charleston.....	A. A. Barnes.
Memphis, Clarksville & Louisville.....	G. C. Breed.
Memphis & St. Louis Packet Company.....	E. B. Byington.
Michigan Central & Great Western.....	C. D. Whitcomb.
Milwaukee & St. Paul.....	A. V. H. Carpenter.
Montgomery & West Point.....	S. D. Hubbard, Jr.
Nashville & Chattanooga and Nashville & Northwestern.....	W. L. Danley.
New York & Oswego, Midland.....	W. H. Weed.
Northern Central.....	E. S. Young.
North Missouri.....	James Charlton.
Ohio & Mississippi.....	C. E. Follett.
Orange, Alexandria & Manassas.....	J. M. Broadus.
Pennsylvania and Philadelphia & Erie.....	H. W. Gwinner.
Pennsylvania.....	D. M. Boyd, Jr.
People's Line Steamers.....	J. C. Hewett.
Philadelphia & Reading.....	C. S. Hancock.
Philadelphia, Wilmington & Baltimore.....	G. A. Dodman.
Pittsburgh, Cincinnati & St. Louis.....	S. F. Soull.
Pittsburgh, Fort Wayne & Chicago.....	F. R. Myers.
Rensselaer & Saratoga.....	O. N. Crandall.
Richmond & Danville.....	Thos. Dodamead.
Rome, Watertown & Ogdensburg.....	H. T. Frary.
Rutland & Burlington.....	W. H. Bryant.
St. Louis, Vandalia & Terre Haute.....	F. Chandler.
Springfield & Illinois Southeastern.....	John Foggett.
Tallahassee & Florida Central.....	F. B. Papy.
Toledo, Wabash & Western.....	J. N. Parsons.
Union Pacific.....	Francis Colton.
United States Mail Steamers Line.....	James Ferrier.
Virginia & Tennessee Air Line.....	Henry Frink.
Western & Atlantic.....	B. W. Wrenn.
Western Union.....	F. Wild.

The Association then proceeded to an election of officers. A. A. Barnes, of the Memphis & Charleston, was chosen President; Francis Colton, of the Union Pacific, Vice President; and F. R. Myers, of the Pittsburgh, Fort Wayne & Chicago, member of the Executive Committee, to fill the vacancy arising from the expiration of the term of S. E. Carey.

It was voted that the next semi-annual convention be held in Milwaukee.

H. W. Gwinner, as Trustee of the *Travelers' Official Railway Guide*, read a report of the present standing and condition of that publication. The report was accepted and G. F. Pierson, Francis Colton and B. W. Wrenn were appointed a committee to draft resolutions expressing the opinion of the Association concerning the *Guide*, to be published in the May number.

The Executive Committee presented the following points for consideration:

- Colonists' tickets.
- Round trip tickets for excursion purposes.
- California emigrants' tickets westward, to be made with special time limitation.

These questions were referred to a special committee, consisting of J. W. Cary, D. M. Boyd, W. J. Phelps, E. St. John, W. L. O'Brien, P. B. Groat, C. D. Whitcomb,

C. D. Owens, S. F. Pierson, P. W. Strader and Francis Colton.

The Executive Committee reported as follows upon the application for commutation of rates for members of the National Commercial Travelers' Association:

The application cannot, in the judgment of the Executive Committee, be entertained as applicable to the purchaser of coupon or through tickets, but must assume the form of an application for local purposes only. And we therefore recommend that the Secretary reply to the National Commercial Travelers' Association that their application cannot be entertained by us as an association, but must be made the matter of a special agreement with each distinctive railroad company.

This report was adopted.

The following is the report of the Special Committee on the *Travelers' Official Railway Guide*, as adopted:

WHEREAS, The representatives of the different railways of the United States and Canada, comprising the General Ticket Agents' Association, have seen and acknowledge the necessity for the publication of a Railway Guide which could be adopted by these different railroads as their official organ, and for publication of correct time-tables, maps, lists of railway officials, and other matters pertaining to a work of such general necessity and use; and,

WHEREAS, The committee in whose hands the publication of the *Travelers' Official Railway Guide* was placed have met with meddlesome and improper opposition, and more especially while carrying out the instructions of this Association in closing a contract which had been made with a publishing house in Philadelphia for the above purpose. Be it, therefore, Resolved, That this Association expressly declares that the "*Travelers' Official Railway Guide*" is the only authorized source of information to the public, in respect of the time-tables and lists of the officers of passenger and accounting departments of the roads herein represented; and that we will use all honorable means to promote the success of the said *Official Railway Guide*, by encouraging its sale upon the trains of our respective roads; and that the Secretary be, and is, hereby directed to give such notice as may be necessary, in order that the railway companies and the public may understand the authentic source to which they may look for information.

Resolved, That this Association accepts and hereby adopts the report of the Chairman of the Committee on Railway Guide, and the Trustees which they have this day made.

The following resolutions were then offered and adopted:

Resolved, that the report of the Guide Committee be adopted and that the Secretary be authorized to furnish a copy thereof to the editor of the *Travelers' Official Railway Guide*, with instructions that it be published in a conspicuous place in said *Guide* over his official signature.

Resolved, that a committee of three be appointed to confer with the Quartermaster General of the United States and to solicit the issue of a general order recognizing the *Travelers' Official Railway Guide* as the standard for railroad distances. D. M. Boyd, S. M. Cole, and Y. A. Dodman were appointed such committee.

The Association passed votes of thanks to the proprietors of the Fifth Avenue Hotel.

James Fisk, jr., was elected an honorary member of the Association, and resolutions of thanks were voted him for an elegant entertainment given to the Association by him on the evening of the 31st of March.

The special committee on colonists' tickets, etc., reported as follows:

Your committee appointed to consider the propriety of issuing colony tickets, round-trip tickets, and San Francisco emigrant tickets with time limitations, beg leave to report:

That in our opinion a special rate for bona fide settlers in the West and South will promote the interests of the railway companies, provided their classes of business can be properly protected; and to accomplish this and provide suitable safeguards, we recommend the adoption of the following plan and rates of reduction:

Resolved, That no reduction will be made from regular established rates for individual members of colonies, or for a less number than twenty-five persons.

Resolved, That the following discount from first-class through rates will be made for the benefit of colonies, under the conditions named below:

Colony of 25 to 49 persons..... 15 per cent.
" 50 to 99 "..... 25 per cent.
" 100 or more persons..... 33 1/3 per cent.

CONDITIONS.

First. Colonists will be required to travel in a body.
Second. First-class tickets shall be used, and the following words stamped or printed on the face of each coupon: "Colony Ticket.—Good ten (10) days from date, only on presentation of permit."

Third. The President and Secretary of the colony will be required to sign an agreement binding the colony to use the tickets within the limit for which they are issued, and to present a permit (form attached) for their use, to the conductors of each road over which the colony passes, which permit shall be taken up by the conductor and returned to his General Ticket Agent, with coupons.

Fourth. One hundred and fifty pounds of baggage will be allowed for each full ticket purchased by colonies.

Fifth. All existing contracts and arrangements for colonies are to be terminated at the earliest possible moment.

The following form of permit is appended:

.....RAILROAD,
General Ticket Office — 187—.

Permit to use Colony Tickets over the
..... Railroad.

Conductors will please accept — colony tickets of form —, destination —, if presented within ten days from —, 187—, the date stamped on such tickets, in accordance with an agreement on file in this office.

Conductors will take up this permit and return it with coupons to the general office.

General Ticket Agent,
..... Railroad.

Resolved, That hereafter through emigrant tickets to California shall be sold only at the principal office of each road at the sea-board points, and only to bona fide emigrants, and that such tickets shall not be sold to parties away from such seaports, or sent to interior points; and, further, that General Ticket and Passenger Agents interested in the matter, and for the mutual protection of lines concerned, be requested to order their agents to comply with this resolution; and, further, that the tickets used for the above purpose shall be in the

form of a contract, and limited to eight days from the Atlantic to Omaha; and that unless presented to the Union Pacific Railroad within such time, the ticket shall be forfeited:

The following shall be the form of a contract for such a ticket, which shall be stamped with a five cent revenue stamp:

SPECIAL TICKET.
"..... Railroad Company. This ticket, and coupons attached, entitle the bearer to one emigrant passage, from — to San Francisco. In consideration of the reduced rate at which this ticket is sold, its use is limited to eight days from point of departure to Omaha, and, unless presented to the Union Pacific Railroad Company within that time, it is forfeited. This ticket is not good unless each check is officially stamped and dated. In selling this ticket for passage over other roads, the — Railroad Company acts only as agent for them, and assumes no responsibility beyond its own line.

"The — Railroad Company will not assume any risk on baggage, except for wearing apparel, and limit their responsibility to \$100 in value. All baggage, excepting that amount in value, will be at the risk of the owner, unless taken by special contract.

"The checks belonging to this ticket will not be received for passage if detached.

"I hereby certify that the purchase of this ticket with the coupons attached, is made subject to the above conditions."

Date Signature

STAMP.
The coupons of such emigrant ticket shall read as follows:

"Issued by by — Railroad Company on account of — Railroad. One emigrant passenger to —.

In consideration of the reduced rate at which this ticket is sold, its use is limited from the date stated in writing in the contract of same. This check is not good if detached.

Your committee deem it inadvisable to offer any recommendation in regard to round trip tickets at this time, preferring to leave it with the road to arrange their own rules.

We further recommend that no tickets be accepted by any railway company except those issued by railway and steamboat lines.

All of which is respectfully submitted.

This report was accepted and adopted.

A resolution was adopted that passengers from the Pacific coast to points east of Omaha holding tickets which call on their face for the transportation of 250 pounds of baggage have that amount of baggage carried free on all lines over which they are ticketed.

To prevent the swindling of travelers it was resolved that no third class ticket be issued, but that all tickets shall be known and named either first-class, second-class, or emigrant, and that all shall be stamped with the date of sale and the name of the officer selling.

It was also resolved that no ticket be altered so as to raise its value and class. When it is necessary to change the class of a ticket it shall be reduced, and the change must be stamped or written on it distinctly, so that conductors may decide at sight the class to which the passenger belongs.

A resolution was adopted requesting all General Ticket Agents of the United States and Canada to have coupon tickets printed with consecutive numbers.

In connection with the other business of the association the schedule of rates was adjusted, the changes to take effect May 1, 1876.

The convention then adjourned.

ALLEGHENY VALLEY RAILROAD.

The regular annual meeting of the company was held in Pittsburgh on the 22nd ult. The road extends from Pittsburgh up the Allegheny river in a direction generally northward to Oil City, a distance of 131 miles. It is one of the chief carriers of petroleum.

The earnings for the year 1869 were:

From freights..... \$251,125 62
From passengers..... 236,074 69
From other sources..... 17,776 65

Total..... \$504,977 96
Operating expenses (57.6 per cent.)..... 291,853 24

Net earnings..... \$213,124 72

An increase in gross earnings of \$276,693 65, or about 30 per cent. over the previous year, with an average increase in the expenses of only \$10,988 65.

An expenditure of \$33,965 32 was made for permanent improvements, and \$127,733 77 for additional rolling stock. The President recommends additional permanent improvements, among them twelve miles of second track, between Pittsburgh & Hulton and new shops and machinery. Additional rolling stock is also needed, and contracts have been made for same. Stock will be obtained for running a through line between Pittsburgh and Buffalo.

The President recounts the manner in which money was secured to build the road and agreements made in consequence with the Pennsylvania Company and the corporations which it controls. First the Legislature passed a law transferring to the Allegheny Valley Company \$3,500,000 in Philadelphia & Erie bonds for an equal amount of Allegheny Valley bonds, the former having a market value and the latter being unsalable. This was done, however, only on condition that the latter should be endorsed by the Pennsylvania, the Philadelphia & Erie, and the Northern Central. These only consented to endorse them on the following terms, which were agreed to:

"First—That it, the said Allegheny Valley Railroad Company, shall and will pay all of the said bonds and interest thereon when and as the same mature. Second—That during the period for which said bonds are made, and until the same are fully paid and cancelled, it will deliver to the Philadelphia & Erie Railroad Company, at said point of connection, at or near the mouth of Bennett's Branch, for transportation, all traffic it can in any manner control which can reach its destination by the roads of the said parties of the second part, or any of them; said traffic to be taken and carried on the basis of an equal pro rata division of the proceeds for the actual distance moved on each line. Third—That it, the said Allegheny Valley Railroad Company will receive from the Philadelphia & Erie Railroad Company, at the mouth of Bennett's Branch aforesaid, all traffic offered by the Philadelphia & Erie Railroad Company, from its own and connecting lines, for transportation to its destination by the Allegheny Valley Railroad and its connections on the same basis of pro rata division of proceeds for actual distance moved.

"Fourth—That the rates for all joint traffic to be agreed upon between all the parties hereto from time to time, but nothing in this agreement contained shall at any time or under any circumstances prevent the said Allegheny Valley Railroad Company, and its connecting lines from taking all classes of traffic at the same rates, it may be carried between any common points accessible by the main line of the Philadelphia & Erie Railroad and its connecting lines; the object and purpose being to keep the Allegheny Valley Railroad as an open highway at all times to the public at equal rates with any of its competitors for traffic. Each party hereto agrees to so regulate its connecting trains of passengers and freight as may be needed at all times to move the interchangeable traffic with promptness and dispatch and to provide their respective proportions of equipment and all other facilities needful to effect said object."

During the past month the President succeeded in negotiating a contract with the Oil City & Allegheny River, the Buffalo, Corry & Pittsburgh, and the Lake Shore & Michigan Southern Companies, for the establishment of through passenger and freight trains between Pittsburgh and Buffalo, without change of cars:

The branch which will make a section in a through line between the lakes and tide-water is spoken of as follows by the President:

THE EASTERN EXTENSION

"The importance of the branch of your road from the mouth of Mahoning to the Susquehanna, as furnishing the very best line of communication between the eastern and western waters, on account of its low summit, easy grades, and directness of route, has been fully set forth in my former reports and those of my predecessors. An exact location of the line, and another year of observation, have more than confirmed our former views in regard to its advantages. Our estimates of the resources of the country through which it passes fall far short of the reality, and there is now ample ground for the belief that the local traffic of the branch road, in coal, iron, lumber and agricultural products, will of itself pay a fair income in the course of its construction. The cost of the road will be beyond our preliminary estimates, but will not possibly exceed \$6,000,000. The work will be vigorously re-commenced in the spring, and prosecuted to completion as rapidly as the sale of the securities applicable to the construction of the road will permit. As these bonds cannot fail to be ranked as first-class railroad securities, we may reasonably count upon their ready sale, and the completion of the work in eighteen months or two years."

The Superintendent, Mr. J. J. Lawrence, gives the following account of the amount of leading articles transported for the past two years:

	Crude Petroleum.	Refined Oil.	Bituminous Coal.
	Barrels.	Barrels.	Tons.
1869.....	726,800	568,899	667,821
1868.....	564,667	568,577	576,186
Increase.....	162,133	Decrease 86,678	Increase 97,635

The establishment of through lines to Pittsburgh and the development of the new and productive oil territory for sixty miles along the line, between Brady's Bend and Venango City, promise to add materially to the business of the road.

—An English inventor, Mr. W. R. Lake, proposes to construct the screw propeller of any desired form or pitch, and in two or more vertical sections perpendicular to the axis of reaction. It is divided in three parts, one of these is keyed or otherwise fixed to the shaft, the others are made to work freely upon the shaft. When the propeller is to be used to propel the vessel, the several parts are secured together by any convenient means, and then form a complete screw propeller. When the screw is not required for the propulsion of the vessel, as, for instance, when sails are used, the sections are disengaged and secured together in a line with each other, presenting a minimum surface of resistance to the passage of the water aft.

—The Western Transportation Company will run the following boats between Buffalo and Chicago and Milwaukee, touching at Detroit: Empire State, Badger State, Idaho, Fountain City, Mohawk, Oneida, Plymouth, Free State, Tonawanda, Buffalo, Susquehanna, Chicago, Potomac. Of these, the six first named are first-class passenger boats, and will be provided with all accommodations for the comfort and convenience of travellers.

—The Evans line will run the following boats from Buffalo to Chicago, touching at Detroit: Philadelphia, Merchant, Annie Young, Winslow, Sun, T. U. Bradbury, and the new iron steamer now building at Buffalo. The Merchant, Winslow, Sun, and Bradbury will be passenger-carrying boats.

Selections.

THE OHIO RAILROAD COMMISSIONER'S REPORT.

We gave in our issue for March 19 the remarks and recommendations of the Ohio Commissioner of Railroads and Telegraphs, General George B. Wright, on the disparity between through and local railroad rates, arbitrary weights for bulky articles, want of uniformity in rates, and fast running of trains within town limits. We copy below his remarks on fast freight lines, want of integrity in management, and railroad crossings:

As certain associations, known as "fast freight lines," have been the subject of criticism, and some complaints have been made to me regarding them, by a few stockholders and directors (only) on roads where they are employed, I deem it my duty to explain, as briefly as possible, what they are and how employed.

They are known and designated as follows:

- 1st. *The Union Railroad and Transportation Company*, called also the "Star Union Line."
- 2d. *The Empire Transportation Company*, called the "Empire Line." (These two are corporations of the State of Pennsylvania.)
- 3d. *The Great Western Dispatch* (owned and operated by the United States Express Company).
- 4th. *The Merchants' Dispatch* (owned by American Merchants' Union Express Company).
- 5th. *The People's Dispatch*.
- 6th. *The White Lake Transit Company*.
- 7th. *The South Shore Line*.
- 8th. *Hed Line*.

And there may be one or two others.

They are all companies or organizations designed especially to facilitate the transportation of through freights between the seaboard cities and the West.

The first three employ freight cars built for and owned by themselves, and adapted to run on roads of the same gauge on which they are employed, or on the 4 feet 8½ inch or 4 feet 10½ inch gauge, by wide tread wheels adapted to either gauge. They solicit and obtain freights from the public through a corps of officers and agents located at terminal points and important stations on their routes, issue their own bills of lading, furnish the clerical labor employed in the business, and, on some roads, perform the manual labor necessary in handling the freight. They receive and deliver their freights and settle with consignees, the railroad companies simply hauling their cars over the track. Their contracts with railroad companies differ, being made with each one separately, and made to conform to the views of the officers of the roads. Some railroad companies are paid by the car load, and some by the ton or hundred pounds. The railroad companies pay for the use of the cars at various rates, some by miles run, irrespective of the loads carried, others per ton per mile on the actual weight moved. The transportation companies maintain their own cars, except when damaged or destroyed while in the custody of the railroad company. The Union Star Line is over the following roads in Ohio:

Columbus, Chicago & Indiana Central.
Cleveland, Columbus, Cincinnati & Indianapolis.
Little Miami and Columbus & Xenia.
Pittsburgh, Cincinnati & St. Louis.
Pittsburgh, Fort Wayne & Chicago.
The Empire Line is over the
Cleveland, Columbus, Cincinnati & Indianapolis.
Lake Shore.
Pittsburgh, Fort Wayne & Chicago.

The Great Western Dispatch is over the Atlantic & Great Western Railway only, in Ohio.

The other organizations above-mentioned are mostly associations of different railroad companies, whose roads form the through lines. Each of the lines make a pro rata division of earnings and expenses, the roads forming the lines each furnishing its pro rata number of cars, and each doing its own ordinary repairs of cars.

These organizations sprung up during the war, when civil transportation was greatly deranged. Many companies were deficient in cars and motive power, and freights were blocked up at transshipping points; great delays and inconveniences were experienced by railroad companies and the public, and shippers and consignees were ready to avail themselves of any arrangement promising an escape from the delays, and prompt settlement of losses and damages at the point of delivery. That they have in great measure succeeded in these two important reforms, and awakened greater vigilance and promptitude in this respect on the part of railroad companies on whose lines they were, as well as on whose lines they were not employed, is universally acknowledged.

No doubt the organization of these transportation companies, and the success which has attended them, has had much to do with the more recent efforts to consolidate connecting lines. It is one of the great problems which are being worked out in this country, and which can be better left to the laws of commerce and of supply and demand, than to any State legislation, which, in my judgment, is entirely powerless to correct the evils real or imaginary, which may attach to these organizations.

As no complaints regarding them come from any other parties than officers of railroad companies on whose lines they are not employed, or stockholders of companies where they are employed, I think the matter may be safely left with the railroad companies themselves, especially when we have on our statute books a law making it "unlawful to elect or appoint to any office of profit or trust of any railroad corporation of this State, any person who is a stockholder, owner or part owner of any express, dispatch, fast freight or transportation company, whether incorporated or not," and if so elected or appointed, making his official acts null and void, "and for every day that he shall exercise or attempt the functions of such office or appointment, he shall forfeit and

pay the sum of sixty dollars, to be recovered at the suit of any stockholder," &c. (See Swan & Saylor's Supplement, p. 116.)

WANT OF INTEGRITY IN RAILWAY MANAGEMENT.

This subject was so fully treated in my last report that I deem it unnecessary to dwell at length upon it here. Many of the complaints which reach me on this subject are based upon rumors, suspicions and inferences. The charges of corruption in officers, agents and employees in sharing in contracts for supplies, in stock-yards, hotels, sleeping car companies and express and fast freight companies, and of engaging in business on the line of the roads involving railroad facilities, as partners or stockholders, to the prejudice or injury of private parties engaged in the same business, are, undoubtedly, not without some foundation; and the fact that so much skill is exercised in concealing these interests is proof of their impropriety.

The theory upon which charters are granted for building railroads, both in this country and in England, is that they shall be managed for the public good, and, beyond a fair remuneration for the capital invested, the public should enjoy the benefits in increased facilities and lower tariff on fares and freights. While some discretion should be allowed to railroad managers in fostering and developing a new and important business, tending to enrich the country and increase future traffic on their roads, yet the same facilities and advantages should be extended to one class of persons as to another; and it would, doubtless, be better for the public and railroad interests, if possible, to exclude railroad officers and agents from any participation in the profits of the company, except as stock or debt holders. They are, in a certain sense, public servants, and any private interests offering a temptation to exercise of favoritism or unfair dealing toward shippers should be removed.

RAILROAD CROSSINGS.

Several complaints have been made to me, during the past year, in regard to the failure of some companies to comply with the law requiring all trains or engines, crossing other railroad tracks at a common grade, "to come to a full stop not nearer than two hundred feet, nor further than eight hundred feet from said crossing, and shall not cross until signaled so to do by the watchman, nor until the way is clear."

Much anxiety and alarm have been manifested by citizens and officers of some roads on this subject. A disposition is manifested by most of the railroad companies to comply with the provisions of this law fully, but there are instances where it is disregarded, the companies not even publishing the rule. One case brought to my notice was where the grade at the crossing is such as to prevent starting a heavy train after it is brought to a full stop. In this case, it was claimed that no risk is incurred if the watchman is faithful to his duty.

This law has now been in force nearly ten years, and no serious collision has occurred at a railroad crossing within the State since its enactment. The public and railroad officials, almost without exception, acknowledge the propriety of such a law, and, although it may not be perfectly adapted to the present state of certain crossings, by reason of high grades encountered at them, its main provisions, with modifications to meet any contingency of grade, should be strictly complied with and rigidly enforced.

The Grand Trunk Railway of Canada.

We may at length fairly congratulate the bondholders and proprietors of the Grand Trunk Railway of Canada on its improved position and brighter prospects. The great advance which has recently taken place in all descriptions of its securities is evidence of the increased confidence felt in the property by investors, and this is still further shown by the eagerness with which the new issue of second equipment bonds has been applied for and taken up by the public. Everything indicates that the Grand Trunk Railway, so long "under a cloud," has passed through its most serious difficulties, and has entered upon that career of prosperity for which its friends have waited so long and so patiently. The rapid decline in the price of gold in the United States is in itself a most important event for the railway. The last report of this company shows that the actual loss sustained on American currency has been not less than \$488,863. This, however, does not represent the whole of the loss occasioned by the disturbance of the financial system of the United States. Increase in the items of wages and the cost of material has adversely influenced the expenditure of the company. With the return to specie payments this exceptional state of things will cease. With gold at par, even with the present traffic, the net results would be sufficient to pay interest upon all the first and second bonds. A comparatively small accession to its traffic would provide the additional funds for covering the third preference. That this increased traffic will be obtained cannot be doubted. The arrangements and satisfactory working of the Buffalo & Lake Huron cannot fail to bring a considerable accession of traffic to the line, and as this will shortly be followed by the construction of the International Bridge at Buffalo, a very large increase in the through traffic may be anticipated. The Intercolonial Railway, too, so long looked forward to as an element of future prosperity, is being vigorously pushed forward, and in a short time will bring its contribution of traffic to swell the business of the Grand Trunk road. Westward the line has secured for itself a share of the Chicago and Western traffic. All that is required is the necessary rolling stock for carrying the increased traffic which may fairly be anticipated, and to provide this, a portion of the second equipment bonds has now been most successfully issued. A few months since he would have been a bold man who, however sanguine may have been his anticipations for the future, would have ventured to predict that the Grand Trunk Railway could have issued a new security which would at the time of its issue command a premium of something like 5 per cent. The feat, however, has been accomplished, and Mr. Potter and his colleagues on

the board deserve the thanks of all connected with the undertaking, for having so far succeeded in placing the affairs of the company upon a sound and satisfactory basis. We hope that we shall now hear no more of dissensions and disputes between the proprietors; that the agitation which has done so much to retard the progress of the concern, and interfere with the management in Canada, will not be again renewed. The prospect held out by the president of the road of payment of the dividends on first, second, and third preference next year, and something at least for the fourth, will, we are confident, be realized, and the day will not then be far distant when the long-suffering and much-enduring shareholders may look forward to some return on their capital.—*London Railway News*, March 12.

RAILROAD TRAVELING IN RUSSIA.

Those who contemplate the possibility of establishing "practicable" railways (to borrow a useful technical term) along the Siberian route which connects Russia with China, should listen to a tale of railway traveling which reaches us from no farther east than a station on the line, between Odessa and Kremenchug. During the first few days of the Russian February—which, it must be remembered, is twelve days in arrears of the February of the progressive west—the trains, delayed by heavy snowdrifts, were constantly from five to twenty hours late. On the 4th (16th) of February a train from Kremenchug reached Odessa fifty-nine hours behind time, conveying passengers, some of whom had nearly perished of cold and hunger on the way. The stations along the line are, it appears, neither sufficiently large, nor, above all, sufficiently stored with provisions to meet the exigencies of a trainful of passengers suddenly "snowed up," and at one station a hundred and fifty third-class passengers had made a vain attempt to obtain shelter in a waiting-room built for the reception of about a third of the number. Very little solid refreshment was to be had, and though there was an abundance of vodka, there was scarcely any water. After a delay of twenty-four hours, the passengers asked the station-master when they would be likely to continue their journey. But the peasants summoned to assist in clearing the line had not yet done their work, and the station-master could give no positive reply. Accordingly a telegram was sent to the Governor-General of Odessa, acquainting him with the state of affairs. A reply, promising speedy relief, was soon received; and after some hours had passed, Baron Ungern-Sternberg arrived with two locomotives, a number of workmen, and a quantity of provisions. The effects of the snow-drift along the line having been sufficiently removed, the train was still unable to start for want of water. A locomotive was sent a distance of sixty versts (forty miles) to obtain a supply, and in the meanwhile an attempt was made to replenish the boilers with melted snow. At last, on the third day, with the boilers half-filled, and with the tenders packed full of snow ready for melting, the train left the station of Veseloi-Kout, and without further accident reached Odessa. On its way it met the mail train from Odessa, which was soon afterward, in its turn, stopped by the snow. In this case the sufferings of the passengers, though not prolonged beyond the comparatively brief space of nineteen hours, were intense as long as they lasted; for the stoppage took place three versts from the nearest station, and fire, food, and water alike wanting. On the 5th (17th) the heavy snowdrifts still continued. The locomotives left the Odessa terminus, armed in front with ploughs for cutting through the snow, and the military were called out. Several carriages filled with troops were sent on before the departure of the mail to clear the way, and the soldiers of the "military train" are said to have rendered very effective service. After the 5th (17th) February, the snowdrifts ceased; a week afterwards the thaw began, and on the 14th (26th) of the month, the port of Odessa was almost free from ice and open to navigation.—*Pall Mall Gazette*.

English and American Boiler Making.

The following comparison of English and American practice in making boilers is given by a correspondent of the *Scientific American*:

English boilers are made of ¼ inch and ½ inch plate. Here they are made of ¼ inch and ¾ inch iron. The foreman in an English shop makes a templet for every new boiler, with the proper camber for the thickness and width of the plate he is going to use; here a wooden strip saves that trouble, the camber is alike in all thicknesses and width of plates, and the warping of the old strip is considerable! It will be observed that in punching boiler iron the holes are rendered taper or wider at the under side than at the top. In England, the wide side is put outside of the boiler, so that the rivet is partly countersunk. When the head is cut off, it is found to be tight in the hole. Here, the plates are bent so that the wide sides of the holes are outside; when the rivet heads are cut off the rivets fall out. In England the riveters always commence in the middle of the rings and work all the slack iron into the seams. Here the plates are riveted across the seams first, and all the slack iron which has to be left in the rings, to get them together, has to be puckered in as best it can. In England a man is placed inside a boiler to hold up the rivets and close the lap. Here a "jump" of iron holds up the rivets, and nobody closes the lap. I have been shot at three times within the last twelve months, and wounded once, with these exploding tin-pot boilers, and I think it is getting time that a Christian community should ask for an investigation into these wholesale murders.

—The *Denver News* says that a bridge has been built over the Arkansas, five miles above Bent's Fort, on the direct route from Kit Carson to Trinidad and New Mexico. All the travel between those points will go that way hereafter, instead of the roundabout way via Pueblo.

UNIFORMITY IN RAILROAD TIME.

In an editorial entitled "Time for the Continent," published last week, we treated of this subject. Since that time we have found the following in the *American Exchange and Review*, a monthly periodical published in Philadelphia. It so entirely coincides with our views as expressed last week, that one might have been inspired by the other. The article below was first published, but it and the facts related in it were unknown to us until this week:

For many years the marine of all nations have referred their observations to Greenwich time. The advantages of a common standard have become so obvious that already, and for some time past, the same system of reference to and comparison with the Greenwich standard, has been applied to the time-keepers of the English railroads, and is now even being extended into all the affairs of common life throughout Great Britain. Greenwich noon is the noon of London, of Glasgow, and of the important places throughout the kingdom. By oft-repeated observations, and by a system of electrical communication by no means complex, and not particularly liable to derangement, the astronomer Royal, at his observatory, regulates the standard clocks of the railroads, and the time-pieces of the public buildings, banking-houses, etc. The system has been found to work most admirably, and all the inconvenience and disadvantages arising from a want of uniformity of time, are obviated and overcome. The change was easily effected, and the results it has brought about are hardly less important in the direction of public convenience, than has been the gradual reduction in the number of systems of coinage, or of standards of weight and measure.

We confess that it has always been to us an almost incomprehensible matter that all our times are referable, not to any one actually-existing heavenly body, but to an ideal one. We do not regulate our clocks and watches by observation on the sun, but by calculations, having as their object to determine when this ideal *mean sun* as he is called, should be at a certain period. The result is that we get *mean time*, in fact the meanest kind of time, as all must confess who have listened to the frequent alterations and warm disputes among owners of watches, who have glanced through a railway guide, or who have had, with firm reliance on their watches, occasion to keep appointments in cities other than their own. The changes rung on time in this country are endless, confounding and annoying. Not only do we hear and read of Philadelphia time, of Altoona, Pittsburgh, Columbus and Chicago times, on our railroad time-tables, but each village, town and city has its own, till "confusion worse confounded" must be an inevitable result.

The system of controlling, at least our railroad clocks, by electricity, is one that could be introduced without much difficulty, and would be conducive to public comfort and safety, as well as productive of convenience to railroad officials. Professor S. P. Langley, the able astronomer of the Alleghany Observatory, in a recent brochure, as well as in a series of letters in the *Pittsburgh Commercial*, handling this subject with great ability, thus describes the most recent and improved apparatus for effecting this desirable change: It is well known that if a wire be wound into a coil it becomes magnetic when a galvanic current passes. If, for instance, we wind a telegraph wire many times round the finger, when this is withdrawn, the hollow coil will be found to attract a piece of iron, which it will tend to draw into the place the finger occupied whenever the distant telegraph battery is in action. If we put our coil into the case of a common clock, whose steel pendulum is vibrating once a second, and cause an electric current to traverse the wire, every second also, it is not hard to see that it will attract the pendulum at every swing, and as the attraction is supposed to be repeated each second, that the clock rate will not be interfered with. But if our clock were to begin to lose, say at the rate of a minute a day, this must commence by its losing a little out of every second; but in this case the attraction would, if repeated exactly on the second, keep it up to its work, and not allow it to begin to lose. In the same way, if the clock were beginning to gain, the magnetism of the coil would hold it back, and in either case the first tendency to error would be stopped. The wire might run on to a hundred clocks, and all be thus kept in unison. Of course, the way to secure the essential condition of the attraction repeated each second, is to lead the distant extremity of the wire (which may be in another city or State) to the pendulum of a very perfect clock, which shall, by touching it, at each swing, originate the electric impulses that may keep any number of inferior time-keepers to its own exactness.

This plan, which is at once forcible and simple, and which has been shown to be eminently successful wherever used, simply takes the common clocks in every-day use. Without alteration and interference, it renders each clock as reliable as the costliest regulator, while in case of the wires being broken or the current stopped by accident, the clock is left to go as it is going now, it being in case of accident simply deprived of the superior correctness the electrical connection bestows.

"If," continues the writer above alluded to, "the 'time' can be thus laid on, like gas or water, to every house; if this can be done everywhere with little trouble and less expense, using existing wires without interfering with the business of the telegraph lines, except for a few seconds daily, and making every depot clock from Boston to New Orleans tell the same story, and indicate the same minute, is it not an end to be sought? The centralization of all our leading roads offers increasing facilities for laying by the old system and introducing an improvement which involves no risk and no novelty, for the whole has had the most thorough trial on railroads elsewhere, and has stood the only test worth much in such matters—that of actual experience, and of that of practical men.

"How many accidents are to be spared us, when this

essential condition of safety as well as convenience in railway transportation is once put on a proper footing, and how certainly the public may be expected to appreciate its advantages, when once tried, we need only look abroad to see.

"It is not an unreasonable anticipation that if the time of some central point, between the Mississippi and the Atlantic, were adopted for the roads of the country, and all time-keepers were regulated from one standard, as in the United Kingdom, that the next step which has been taken there would follow here, and that without particular trouble or sudden change; all the time-keepers throughout the country would soon be indicating 'railway time,' which would be that of some point about midway between the Mississippi and eastern termini of our principal railroad system."

"THE RAILWAYS OF THE FUTURE."

Under the above heading there appeared in the *Times* of February 18, and March 1, two very remarkable articles on this all-important question,—remarkable because of the intelligible manner in which the subject (in itself a most complicated one, even to those learned in the profession of engineering), has been simplified and laid before the world, so that all who read can understand. We have deemed it one of the most important questions of the day, and its proper solution would, we are certain, be hailed as the greatest boon to the country at large, and to the great body of shareholders in particular, whose special interests it has always been our aim to protect. We have carefully watched the progress made by Mr. Fairlie with his system, and it is most gratifying to us to find that all we have stated in favor of it has been more than borne out by the results of the experiments which gave rise to the articles in question; the detailed account of these experiments, as made by the Commissioners, under the Presidency of the Duke of Sutherland, was published in our columns at the time. There were, however, two very material points in the discussion which took place after the reading of Mr. Spooner's paper at Tanybwlch, on the working of this little railway, which the *Times* has omitted to notice, to which we wish to draw attention. These were, first, the relative dead weights carrying a ton on the broad—i. e., 4 ft. 8½ in.—gauge as it is, and on the 2 ft. gauge—the narrow gauge is now becoming so popular that the hitherto narrow gauge—i. e., 4 ft. 8½ in.—must henceforth be called the broad gauge; and, secondly, the consumption of fuel in the Fairlie, as compared with ordinary engines.

We desire to call attention to these because of the importance to the general question, and because they are not properly known. The results now so highly favorable to the narrow gauge and the Fairlie engine might lose much of their value if they are bought at too high a price in dead weight in the former, and too large a consumption of fuel in the latter. It was thought just possible we might be paying too dear for our whistle, and this view of the case evidently occurred to several members of the Russian and Indian Commissions, who had so carefully watched every feature of the experiments, in order to satisfy themselves of their genuine character. These questions were very satisfactorily replied to by Mr. Spooner, who stated, roughly speaking, that the proportions were 3½ tons paying weight to 1 ton of dead weight; but in many cases it was much more, as he often carried 8 tons of timber in two 12 cwt. trucks. With respect to the consumption of fuel in the Fairlie engine, Mr. Spooner alleged that there was a saving of 25 per cent. over the ordinary engines for the same amount of work done. Mr. Crawley, contractor of the Poti & Tiflis and Mexican railways, asked if Mr. Spooner meant that, taking one of his ordinary engines singly, or coupling two together to do a given duty, that the consumption would be 25 per cent. less with the Fairlie engine doing the same duty. For instance, if the two coupled engines used 200 pounds of fuel to carry 100 tons a given distance, would the Fairlie engine do the same work in every respect with 150 pounds? Mr. Spooner's reply was, "Certainly it would." And he further added that he had carefully investigated the matter during the eight months he had the Fairlie engine at work.

Now, what we desire to say is this—the results of the experiments made have been truly recorded, independently of their being certified by the Duke of Sutherland and the commissioners, and it is within our knowledge that they are correct. Then why should there be any more hesitation about adopting a system which has given such results? Why on earth do we go on building expensive broad gauge lines, especially in our colonies and India? Are we to remain tied in the hands of the few obstructive who say we won't move on? Are those portions of our island which have no rail accommodation to remain in that condition because we cannot build railways that will pay, and because we may be told, as the Brighton Railway shareholders were, that we had better light our pipes with our bank-notes? We think not; the time has now arrived for ascertaining why this system of double-bogie engines is not adopted.

If, as the *Times* says, they run infinitely smoother than other engines—the commissioners call it a smooth-floating movement—that they do not "murder the rails in their violence," and, as Mr. Spooner says, there is a very large saving in fuel for the work done, with a great economy in wages, why should we lose further time in their introduction? If all that has been stated in favor of this double-bogie engine, or part of all, or any, can be contradicted by those who are opposed to the principle, why don't they come forward and do so?

Mr. Fairlie states very distinctly that he can produce engines that shall weigh no more per wheel than the load now on an ordinary coal truck, but yet capable of hauling as many tons in a train as the most powerful monsters which are now so heavy as to "murder the best steel rails" in a very short time; that these engines will work well on light and cheap lines with 40 lb. iron rails, the latter lasting twice as long as the heaviest steel rails on the best-laid lines; that he can make a 2 ft. 6 in. gauge line, work as many tons over it, and in the same time, as the most capable 4 ft. 8½ in. gauge line now existing, with

an enormous reduction in dead weight; and, finally, that he can, with the assistance of the Ramsbottom water troughs, double the water carrying capacity of the very best lines in the country. These are very plain and very distinct statements, which it is so easy to upset, if not true, that we wonder why those who are so opposed to the system do not at once come forward and expose the fallacy, if fallacy it is. Mr. Fairlie is no conjuror; his engines are open to the inspection and criticism of all, consequently there can be no difficulty in clearing him away if he is wrong. We do not want such nonsense as was contained in Mr. Hamilton H. Fulton's letter which we could almost think was written at Mr. Fairlie's request, in order that the latter might have an opportunity of extinguishing the writer. There is no doubt an enormous amount of *vis inertia* to overcome in our railway managers in regard to anything that is new. While we cannot for a moment adopt Mr. Jones's plan of penny railway trips, we are still certain that cheaper fares and economy in working are what we must have, and if our present managers will not agree to this, they must be asked to make way for others who will move forward in this direction.—*London Railway News*, March 12.

Inclined Plane Railroads.

There are several companies about to build railroads up the side of the steep hills about Pittsburgh, so that they may be made accessible and suitable for residences. The *Pittsburgh Chronicle* gives the following description of one of these roads:

The road reaches from the base of Coal Hill, starting a short distance below the Birmingham suspension bridge, to the top of the hill in Mt. Washington village. The incline is thirty-five degrees, equivalent to a grade of 3,700 feet per mile, or a rise of one foot in one foot and four-tenths. The length of the incline is 670 feet, and the height is 333 feet. There is a double track, with two engines at the top of the incline, with cylinders twelve inches in diameter, twenty-four inch stroke, two boilers, each twenty-five feet long by forty-two inches in diameter. The cars will be let down and drawn up by means of wire ropes one and a half inches in diameter, coiled on drums eight feet in diameter. Such ropes are calculated to withstand many times the weight they will ever be called upon to sustain, but, in addition, there will be a separate safety rope attached to each car, working over sheaves, which would immediately stop them should anything happen to the working cable. The cars have a very peculiar construction to fit upon the grade—the floors, or decks, having an angle to the track, so as to be at all times level, corresponding to the angle of the incline. The entire arrangement of the tracks, and the details of plan and workmanship are such that no accident can be foreseen as likely to happen, either by carelessness or neglect of the operatives, and so that any person can satisfy themselves of their entire safety at any time.

If the projectors of inclined planes will make it an object to have them pay only by the increased value they will add to their vacant lots on the hill tops, they will undoubtedly prove financial successes. The least tolls that will pay their ordinary working expenses, will in this way, prove to be the best. In not many years we may hope to hear of the prosperous towns, which will owe their existence to inclined planes, making them free to every person as our bridges should have been declared long ago.

Experiments on Steel.

Recent experiments on steel by the hydraulic machine of the Illinois & St. Louis Bridge Company furnish some interesting data respecting the strength of that metal. The results indicate a superiority in American steel over that of English make, at least judging from a comparison with the statement of the results of experiments made in England.

Result of experiments on steel from New York city, tested at the office of the Illinois & St. Louis Bridge Company, subjected to a strain of compression:

Inches.		Modulus of elasticity.	Limit of elastic re-action.	Ultimate strength.
Length.	Diameter.			
9.193	1.106	27,000,000 lbs.	68,000 lbs.	101,000 lbs.
9.904	1.122	27,000,000 "	71,800 "	108,800 "
9.110	1.102	30,000,000 "	70,000 "	97,300 "
8.969	1.115	26,000,000 "	70,000 "	101,300 "
9.145	1.122	31,400,000 "	68,000 "	103,000 "

These figures apply in all cases to specimens which bent without cracking.

Steel has also been tested from Philadelphia, Brooklyn, N. Y., and Pittsburgh, Pa., but the results have not been made up yet. Mr. Paul Dahlgren is in charge of the experiment.—*St. Louis Republican*.

A New River Steamer.

The *Mississippi Valley Review* gives the following description of a new stern-wheel river boat, of peculiar construction, which Captain Wm. J. Kountz is now building in Pittsburgh:

The Kate P. Kountz will have 230 feet keel, 237 feet length of deck, beam 50 feet, and hold 6½ feet. Her engines will be low-pressure—the Hartuppe Moderator. She will be provided with four boilers in two batteries. The boilers have not been contracted for. She is to be exclusively a freight boat, and will carry 1,500 tons; and is not to draw more than 38 inches light. She is being constructed of heavy materials, and will be divided into thirteen water-tight compartments, so as to be perfectly secure even if the hull should be broken by snags or any other obstructions. The Kate P. Kountz will have no guards, and two chimneys, although only one was originally intended. Here is a steamer, it will be observed, suited for any Southern or Western river—from St. Louis to New Orleans, or St. Paul, Pittsburgh or the Rocky Mountains.

KANSAS PACIFIC RAILWAY.

Annual Report of the Board of Directors for the Year Ending 1869.

The annual meeting of the stockholders of the Kansas Pacific Railway convenes to-day, at Lawrence, Kansas, and the following is the report of the President and Board of Directors, which will be submitted:

To the Stockholders of the Kansas Pacific Railway Company:

The Board of Directors submit herewith their annual report of business, earnings and general affairs of the company for the year ending December 31st, 1869:

EARNINGS FROM FREIGHTS.	
Commercial.....	\$1,128,848 50
Government.....	227,358 06
Construction.....	144,212 71
Total freight.....	\$1,500,419 27
PASSENGER.	
First class.....	\$ 536,478 52
United States troops.....	85,363 42
Expresses.....	30,179 25
United States mails.....	65,500 00
Total passenger.....	\$ 717,521 19
MISCELLANEOUS.	
Rents.....	\$ 4,709 01
Individuals and companies.....	3,300 64
Sundry sources.....	
Total miscellaneous.....	\$ 7,909 65
Total.....	\$2,225,850 11
EXPENSES.	
Conducting transportation.....	\$ 331,145 30
Motive power.....	489,457 22
Maintenance of cars.....	101,372 64
Maintenance of way.....	396,221 65
General expenses.....	67,983 83
Total working expenses.....	\$1,386,189 02
Net earnings.....	\$ 839,670 09
Distribution of earnings, merchandise and passenger traffic.....	\$1,703,415 92
Government business.....	378,221 48
Construction material.....	144,212 71
Total.....	\$2,225,850 11

The average length of road in operation during the year was 438 55-100 miles—being 35 miles more than in 1868.

The gross earnings were equal to \$5,075 48 per mile of road operated—this is an increase of \$339 85 per mile on the earnings of last year.

Total number of passengers carried in 1869 was 146,583, an increase of 37,251, or 34 per cent. on the passenger travel of 1868.

Total amount of freight carried in 1869 was 175,508 tons, an increase of 51,141 tons, or over 41 per cent on the tonnage of 1868.

Average distance one ton freight was transported, 140 miles. Average distance one passenger was transported, 66 miles; being 22 miles less for freight than 5 miles more for passengers than last year.

It will be observed that the business of the road has been almost entirely of a local character, and a very large proportion of it has been confined to the first two hundred miles of the line west of Kansas City.

The terminus at Sheridan was in the plains, and offered few facilities for business. Excepting a portion of the new Mexican and Southern Colorado trade, and Government business for the military stations in these regions, little through traffic has been done in 1869. The road was not far enough advanced towards the mountains to secure any of the Denver business, and the northern line divided with us the trade of the Arkansas Valley and Santa Fe. With the completion of the road to Denver all this trade, with that of the rich mineral region to the west and south, gravitates naturally to this route.

The result of the year's business, as shown above, is a gratifying evidence of the wealth and development of the country through which your road runs, and of the permanent value of the enterprise, since the receipts from local traffic alone have been so large, and from year to year show such a rapid increase.

The regular mercantile traffic for the year shows a handsome increase over that of 1868, and, as less than one-eighth of this trade was with points west of Ellsworth, the result gives ample promise for the future local business of the road when the country adjoining the western half of the line shall become settled with an energetic and thrifty population such as is now pouring into the eastern counties.

Mercantile traffic in 1869 was.....153,015 tons.

1868 ".....91,193 "

Increase.....61,822 "

Or nearly 68 per centum.

A considerable reduction in rates was made in the early part of the year, amounting to an average of 10 per cent. on passenger fares and 20 per cent. on freight rates; and, in order to stimulate the settlement of the lands along the line, larger reductions were made on lumber, grain, household goods, agricultural implements, stock and other articles necessary to settlers.

The gross receipts from commercial business for 1869 were.....\$1,703,415 92

For 1868.....1,381,729 54

Showing an increase of.....\$421,686 38

Or 33 9-10 per centum.

Of the freight transported in 1869, 141,341 tons were west bound, and 34,177 tons east bound, showing that freight moving westward was more than four times as great as that moving eastward. This inequality in the movement of freight necessarily increases the expense of operating the road. It will be gradually lessened hereafter as the country becomes settled up, and the products of the soil seek the eastern markets. But we look confidently for an immediate return of business from the lumber, coal, cattle and ores of Colorado, as soon as the road is completed and in operation to Denver.

Fifty thousand and forty head of Texan cattle were

shipped westward in 1869, chiefly from the stations of Abilene and Salina.

This class of freight has been materially affected by recent restrictive legislation in the State of Illinois, the leading market for Texan stock, and the shipments over the road were thereby confined to two or three months of the year. With free transit secured for these cattle throughout the year east of the Mississippi river, a much greater number would be moved by this company.

It is now well established that almost all kinds of stock cattle can be raised more cheaply in Northern Texas, Eastern Colorado and Western Kansas, regions directly tributary to this line, than in any other portion of the United States, and we may reasonably regard the transportation of stock as one of the permanent sources of revenue to the company. The cattle shipments from the rich grazing lands of Colorado promise soon to rival those heretofore made from Abilene, six thousand head being now reported awaiting transportation at Kit Carson, 487 miles from Kansas City. It is the true policy of the company to stimulate and foster this trade by all proper means, and to afford facilities for shipment as needed at different points on the line.

The expenses of operating the road during the year 1869 were 62 9-10 per centage of the gross earnings, being eight per cent. more than for the preceding year.

The increase in expenses has been due—first to an unusual outlay in the permanent improvement of the road in correcting alignment, lowering grades, replacing temporary structures by permanent ones, and in generally bringing the road up to a first-class condition; and second, to the large expenditures rendered necessary by the disastrous floods of June and July, which destroyed several bridges and swept off a large amount of embankment. The movement of trains over a portion of the line was delayed nearly two weeks by these floods, and it is estimated that the company incurred an expenditure of more than \$100,000 in repairing the damages sustained. At the points menaced by overflow the track and bridges have been raised above the highest limit of floods, and a recurrence of these disasters is not now anticipated.

Such improvements have been made during the year that the general condition of the line is much better than ever before.

Further details regarding the transportation department will be found in the accompanying report of the General Superintendent.

The operations of the land department during the year are shown in the following statement:

Acres sold.....	384,185
Cash received.....	\$247,386 49
Notes.....	700,904 98
Total.....	\$1,008,191 47
Expenses.....	35,551 89
Net proceeds.....	\$972,639 58

The total land grant to the company is about 6,000,000 acres, of which 1,000,000 only, lying east of Ellsworth, have been in market during the year.

The result of sales is very satisfactory in view of the active competition existing between the various companies possessing large grants of land in the State.

The land department has been efficiently managed, and a portion of the settlers moving to Kansas have been secured to the line of this road.

Your board are well satisfied that the best interests of the company are served by holding the lands at a fair and moderate price per acre as an inducement to their speedy settlement, and the wisdom of this policy is shown in the magnitude of the sales made, and in the very large increase in the local business of the road. We believe that the lands of the company are now offered for sale at lower rates and on more advantageous terms to the purchaser than any other lands equally fertile and desirable in the country.

EXTENSION TO DENVER.

At the date of your last annual meeting the western terminus of the road was at Sheridan, 405 miles from the State line of Missouri, and 11 1-15 miles beyond the point to which the bonded aid from the government extended.

The terminus at Sheridan was unsatisfactory, and failed to give the company command of that portion of the Colorado trade which geographically should come to this line. There was a gap of about 230 miles between Sheridan and Denver, which it was essential to the complete success of this enterprise should be filled at as early a day as practicable.

Your board in their last report urged the immediate construction of this portion of the line, and gave strong and comprehensive reasons for the work. The recommendations then made were approved by the stockholders and the construction of the road to Denver decided upon.

Acting under due authority, your Board authorized the execution of a mortgage for \$6,500,000, secured upon the road to be constructed (about 237 miles), and on 3,000,000 acres of the company's lands lying between the 394th mile post and Denver, and adjacent to the line. The bonds issued under this mortgage were offered on the market in August last, and it affords your Board great pleasure to state that almost the entire loan has been satisfactorily placed, and that the funds are now secured for the completion of the road.

At this date the track is laid and the road in operation to Kit Carson, 82 miles west of Sheridan. The grading is all under contract, and iron and other material ordered for delivery within the next three months for the remaining 150 miles between Kit Carson and Denver, and it is expected to have the whole road finished and in operation by September next.

The Denver Pacific Railway and Telegraph Company, with whom a contract was made in accordance with the act of Congress of March 3, 1869, for the construction of that portion of the road between Denver and Cheyenne, 106 miles, have already laid 58 miles of track, and the remaining 48 miles will be finished and the road in operation by June 30th next. The interest of this company dictated the acquiescence of your Board in the passage of the act of March 3d, 1869, and in the execution of the

contract therein provided. But after its execution, to prevent that road from falling into hostile hands, some individual owners of large interests in your line became the active managers of the Denver Pacific Company, providing the funds for building the road, and successfully negotiating its securities in England; and in order to protect the interests of this company, and to secure permanently the satisfactory management of the line north from Denver, arrangements were made by which the company obtain the ultimate control of a majority of the stock of the Denver Pacific Railway and Telegraph Company; and, as a further protection against a ruinous competition in business, a contract was entered into between the two companies to divide equally the gross earnings of 213 miles of the roads nearest to Denver. The entire line, therefore, between Kansas City and Cheyenne, having a common interest, will, so far as the public is concerned, be operated as one road.

It is guaranteed by act of Congress "equal advantages and facilities as to rates, time and transportation, without any discrimination of any kind," in its connection with the Union Pacific Railroad at Cheyenne and thence by becomes a part of a continuous line to the Pacific ocean; and by the autumn of the present year it will enter fairly into the field for a share of the through business with California.

In addition to this through trade, the indications of future business with Colorado are very promising, and your board have reason to believe that the advantages to accrue from the completion of the road to Denver, as set forth in their last report, have in no respect been over estimated.

The gross earnings of your road for 1870 will probably approximate \$3,000,000, and with the natural growth of trade in Colorado and Kansas immigration, stimulated by the completion of these railroads, the gross earnings for 1870 will doubtless exceed \$4,000,000.

No positive action on the proposed extension of your road via the 35th parallel has been taken since the date of last report. There is at present an unwillingness on the part of Congress to grant further bonded aid to railroads. A bill, however, has been submitted to Congress proposing grant of lands to this company to aid in the construction of a road from the most eligible point on the line at or west of Ellsworth, via the Arkansas and Rio Grande rivers, to a point on the northern boundary of the republic of Mexico. This bill has received favorable consideration from the Pacific Railroad committees of both the Senate and the House, and should it become a law, will enable the company to commence the work at once. The extension, as proposed in this bill, will form the first link in the great continental line to the Pacific by way of the 35th or 32d parallels, which the demands of commerce will require to be built before many years either with or without further aid from the Government.

In conclusion, your board express their acknowledgment for the faithfulness and care with which the various departments of the company have been managed during the year. By order of the board.

(Signed) JOHN D. PERRY, President.

St. Louis, April 1, 1870.

THE BANKERS OF THE WORLD.—The Merchants and Bankers' Almanac, for 1870, in one volume octavo, 240 pages, price two dollars; contains: 1. List of 1,650 National Banks; location, names of President and Cashier of each; capital and name of New York Correspondent, of each. 2. List of 300 State Banks in operation; names of President and Cashier of each. 3. Names of 1,800 Private Bankers and Savings Banks in the United States and Canada, and name of New York Correspondent of each. 4. Names of 1,800 Bankers and Brokers in New York City. 5. Monthly Prices of Cotton, Wool, Corn, Sugar, Molasses, Tobacco, Coffee, Wheat, Oats, Rye, and Flour, for forty-three years, (1825—1869,) and crops in 1868. 6. Names of new Marine, Fire, and Life Insurance Companies, in each State. 7. Daily Price of Gold, in New York, from January, 1864, to December, 1869. 8. Progress of Railroads in the United States and in each State, from 1835 to 1869, number of miles, cost, etc. 9. The Cotton Crop of the United States, 1860 to 1869—annual product of each State, export, consumption, etc. 10. The monthly prices of eighty staple articles, at New York, year 1869. 11. Alphabetical list of 2,000 Cashiers in the United States. 12. List of 1,000 Bankers in Europe, Asia, South America, Australia, West Indies, etc. 13. Lowest and highest prices of leading Government, State, Bank, and Railroad Shares, Bonds, etc.—years 1868-9. 14. The Clearing House, New York, annual exchanges, 1854-1869—Officers, 1869-70. 15. Statistics of Immigration; Table of income and expenditure of the United States Government. 16. Monthly Statement of the Public Debt of the United States, July to December, 1869. 17. Imports, Revenue, Public Debt, etc., of Great Britain, 15 years. With engravings of new Bank Buildings, and Seven Steel-engraved Portraits of eminent merchants and Bankers.

—Charles Morgan, the New Orleans steamship man, who now controls the New Orleans and Galveston business, according to the *Pensacola Observer*, is about to establish a line of steamers between New Orleans and Pensacola, making, in connection with the Pensacola & Louisville Railroad, a route to Montgomery and points further north and east. The distance from New Orleans to Pensacola is about the same as to Mobile, while the harbor is much better. The *Observer* adds: "Here the steamer connects with the railroad at a common wharf, and goods are transferred in one handling, and passengers meet with no delay, while at Mobile goods are landed, hauled, drayed; hauled, shipped and handled before they reach the railroad at Tensas landing, and passengers during this time are delayed from eight to ten hours."

Chicago Railroad News.

Michigan Central.

The new management of the Great Western proves very advantageous to the Michigan Central; for the reforms already effected have made the running of trains as regular as on other routes, and now it is very seldom that a connection is missed at Detroit. Mr. Muir is proving decidedly the man for the place. He has not hesitated to make changes which he believed to be reforms, even when there has been bitter opposition. He proves his manhood, as well as his executive ability, by aiming at efficiency rather than popularity.

Mr. Sargent went to New York this week to confer with the representatives of the South Shore and Pennsylvania routes concerning the spring and summer time table.

The following table shows the number of immigrants carried west by this road during the year 1869:

Months.	Number.
January	35
February	240
March	441
April	1,637
May	4,540
June	7,450
July	3,638
August	3,010
September	1,839
October	1,080
November	1,459
December	1,459
Total	34,613

The earnings for the month of March are almost the same as last year, there being a decrease of a fraction of one per cent.

Chicago & Northwestern.

The rates on wheat and flour from points on the Mississippi to Chicago, have been fixed as follows, for the spring. They are the same to Milwaukee, by the Milwaukee & St. Paul Road:

From St. Paul and river points as far down as Prescott, for wheat to Milwaukee or Chicago, 18 cents per bushel, and for flour, 60 cents per barrel.

From Red Wing and points above to Wabashaw, for wheat to Milwaukee or Chicago, 17 cents per bushel, and for flour, 60 cents per barrel.

From Fountain City, for wheat to Milwaukee or Chicago, 16 cents per bushel.

From Winona to Prairie du Chien, for wheat to Milwaukee or Chicago, 15 cents per bushel, and for flour, 50 cents per barrel.

This is a considerable reduction on last year's rates.

The "Diamond Jo" line of steamers, which run in connection with this road between Fulton and points on the Upper Mississippi River, is expected to make regular trips after this week. They will probably bring large amounts of Minnesota wheat to be shipped over the line.

At the Clinton shops a very elegant car is being built as an officers' car. It will, doubtless, be almost constantly in service.

New Locomotives.

The Baldwin Locomotive Works (M. Baird & Co.) have recently sent to this city two very fine switching locomotives, one of which is for the North Chicago Rolling Mills, and the other for the Milwaukee Rolling Mills. The Baldwin Works have now turned out more than two thousand locomotives.

Goodrich Transportation Company.

This company has sent out a steamboat, we believe, every month this winter. Its business is chiefly with Lake Michigan ports. The officers of the company are: A. E. Goodrich, President; T. G. Butler, Superintendent; W. H. Wright, Secretary and Treasurer. The company built last year for this season's business, a fine side-wheel steamer, the Cowna, expressly for passenger business. It is one of the finest and most elegantly furnished and equipped vessels afloat on the lakes. It will be the great attraction of the Chicago and St. Joseph line.

The company is now building at Manitowoc a new propeller, 185 feet long, 30 feet beam, and 11½ feet hold, with a capacity of 800 tons. It is to be finished in June, when it will run between Chicago and Green Bay.

The following is a list of the steamers, commanders and routes for 1870:

WEST SHORE ROUTE.

Side-wheel steamer Manitowoc—B. Sweeney, Commander; Edward Dorsey, First Officer; Jacob Lang, First Engineer; Henry Pates, Clerk.

Side-wheel steamer Sheboygan—Chas. McIntosh, Commander; Michael Crossin, First Officer; W. Elliott, First Engineer; Charles G. Thompson, Clerk; John Lee, Steward.

GRAND HAVEN AND MUSKOGON ROUTE.

Side-wheel steamer Alpena—John F. McCormick, Commander; Henry White, First Officer; C. Curry, First Engineer; Warren Dorren, Clerk; Gavin Watson, Steward.

Side-wheel steamer Orion—A. Finefield, Commander; M. McGraw, First Officer; J. Lieby, First Engineer; A. Landholt, Clerk; Fred. Kaiser, Steward.

CHICAGO AND ST. JOSEPH ROUTE.

Side-wheel steamer Corona (new)—N. W. Napier, Commander; Robert Jones, First Officer; W. H. Binney, First Engineer; J. R. Clarke, Clerk; James Gee, Steward.

CHICAGO AND GREEN BAY ROUTE.

Steamer Truesdell (screw)—Thos. McDonald, Commander; Thos. Belton, First Engineer; Edward P. Ever, Clerk.

Steamer St. Joseph (screw)—John Gilman, Commander;

Stephen Morgan, First Officer; D. O'Brien, First Engineer; Wm. H. Guyles, Clerk.

Illinois Central Railroads.

The following is the report of land sales and earnings for the month of March.

LAND DEPARTMENT.			
Acres Construction Lands sold	6,016.42 for	\$37,348.80	
Acres Interest Fund Lands sold	200.00 for	2,490.00	
Acres Free Lands sold	350.00 for	6,550.00	
Total Sales during the month of March, 1870.	6,576.42 for	\$46,388.80	
To which add Town Lot sales		95.00	

Total of all	6,576.42 for	\$46,483.80
Cash collected in March, 1870.		\$160,355.73

ESTIMATED EARNINGS—TRAFFIC DEPARTMENT.			
	In Illinois	In Iowa	Total.
	707 miles.	258½ miles.	965½ miles.
Freight	\$221,386.00	\$63,471.00	\$284,857.00
Passengers	143,372.55	\$3,889.90	147,262.45
Mails	6,375.00	1,029.08	7,404.08
Other Sources	74,000.00	1,970.92	75,970.92
Total March, 1870.	\$245,013.55	\$69,360.90	\$314,374.45
Total Actual Earnings, 1869.	611,305.02	98,279.36	709,584.38

Chicago & Alton.

The annual election of directors and officers was held this week at the President's office in this city. The terms of three directors—John Crerar, of Chicago, Lorenzo Blackstone, of Norwich, Conn., and John J. Mitchell, of Alton;—expired at that time. They were all re-elected, as were also the company's officers, viz.: T. B. Blackstone, President; and W. M. Larabee, Secretary and Treasurer.

Preparations have been made to extend the Dwight & Wabasha Branch, recently acquired, westward 18 miles to Lacon, on the Illinois river, immediately. There is an old grade the whole distance, and the work will be comparatively light.

Chicago, Rock Island & Pacific.

The new dummy train running between Chicago and Blue Island over the track built last summer through Washington Heights, which was put on last Monday, is doing very well. At least a hundred new houses will be built this season between Englewood and Blue Island, so the suburban travel is sure to increase.

Some time ago mention was made of arrangements for transporting a party of clergymen by way of this line and the Union and Central Pacific roads to the Pacific coast. Rev. H. D. Jenkins, of Joliet, has been canvassing the matter, and it is now pretty well ascertained that between three and four hundred persons will take advantage of the opportunity. Ministers and their families will be carried the round trip for one fare—that is, \$118 will pay for the journey from Chicago to San Francisco and return.

The Davenport *Gazette* says: "It is said the Chicago, Rock Island & Pacific Railroad has a soul. In the late storm, a train was snowed up at Avoca, containing 120 passengers. Superintendent Royce fed the body of people until the way was cleared and the train continued its journey,—and, what is more, he never said anything about the matter. However, 'it has leaked out, to the credit of Royce and the road. We have always insisted that this was the best road across Iowa, 'by all odds, and we adhere to the opinion.'"

LOCOMOTIVE STATISTICS.

Illinois Central.

The report of S. J. Hayes, Superintendent of Machinery of the Illinois Central Railroad, for the month of January, 1870, affords the following:

The number of miles run by trains was as follows:

Passenger trains	108,803
Freight	810,311
Construction	8,648
Wood	811
Switching	50,293
Total	479,866

The cost per mile run was

For oil and waste	77 cts.
" fuel	7.35 "
" engineers and firemen	5.75 "
" cleaning	1.19 "
" repairs	11.31 "
Total	96.39 cts.

Cost per mile run, in cents:

Passenger engines	19.65 cts.
Freight	39.15 "
Construction	14.97 "
Switching	13.89 "

Average number of miles run to

Pint of oil	13.40
Ton of coal	83.55

The above oil includes that used in headlights and in lamps of engineers. Wood is rated at \$6.50 per cord; coal at \$2.25 per ton, loaded on tenders; oil, 60c. per gallon; waste, 15c. per pound. Re-building, superintending, teaming and all other expenditures appertaining to repairs are included in the above cost of performance of locomotives.

The whole number of locomotives owned by the company is 178, all but two coal burners. The length of the road operated is 939 miles. No mileage is reported for seventeen engines. Twenty had repairs during the month, and one is rebuilding.

PERSONAL.—Captain C. E. Sencenbox succeeds James Walsh as the Chicago Agent of the Northwestern Union & Northern Packet Line. His office is at No. 53 Clark street. Mr. Walsh now devotes himself exclusively to the business of the Baltimore & Ohio Railroad, which is constantly growing in importance.

REGISTER OF EARNINGS.

FOR THE MONTH OF MARCH.

Chicago & Alton, 1869.	\$388,786.73
" " 1870.	344,355.53
Decrease (11¼ per cent.)	\$44,431.20
Michigan Central, 1869.	\$388,137.70
" " 1870.	384,430.68
Decrease (¼ of 1 per cent.)	\$3,707.02
Chicago Rock Island & Pacific, 1870.	\$443,700
" " 1869.	508,740
Increase (11¼ per cent.)	\$44,900
Lake Shore & Michigan Southern, 1870.	\$1,163,697
" " 1869.	1,140,000
Increase (2 per cent.)	\$23,697
St. Louis & Iron Mountain, 1870.	\$118,894
" " 1869.	64,937
Increase (107 per cent.)	\$53,957
Chicago & Northwestern, 1869.	\$1,143,165.87
" " 1870.	873,114.60
Decrease (23½ per cent.)	\$270,051.27

THIRD WEEK OF MARCH.

Pacific of Missouri, 1869.	\$73,575
" " 1870.	70,508
Decrease (4 per cent.)	\$3,067
Kansas Pacific, 1870.	\$41,685

NAVIGATION.

—The New York *Journal of Commerce* enumerates the advantages of the proposed Darien Canal, as follows: "As compared to the route via Cape Horn to Calcutta, there would be a saving of 9,600 miles; to Canton, 11,900 miles; to Shanghai, 11,600 miles; to Valparaiso, 8,100 miles; to Callao, 10,000 miles; to San Francisco, 14,000 miles; to Wellington, New Zealand, 2,620 miles; to Melbourne, Australia, 2,830 miles. The saving, in comparison to the Cape of Good Hope route, would be, to Calcutta, 4,100 miles; to Canton, 8,900 miles; to Shanghai, 9,800 miles; to Wellington, 5,260 miles; to Melbourne, 3,340 miles. For the English trade to India, the Suez Canal would offer better inducements, but the time and expense of English vessels to China, Japan, and Australia, would undoubtedly be abridged by the Darien Canal; at all events, the canal may be expected to take a share of England's traffic which now comes and goes through the Suez Canal. All American vessels trading with Japan, China, and Australia, and, of course, those bound to and from the Pacific coast, will seek the American Isthmus Canal. Its advantageous effect upon American commerce and national prosperity would be immense."

—A correct list, to January 1, 1870, of the United States lighthouses and beacons on the coast of the lakes, has been published.

The Eleventh Lighthouse District embraces the American shores from a point north of Grassy Island, in the Detroit river, and including lakes St. Clair, Huron, Michigan and Superior, with their respective arms and connecting straits making a shore or coast line of upward of 3,000 miles in length, and upon which five of our States and Canada have boundaries.

Within the Eleventh District there have been constructed, during the past season of 1869, four new lights which will prove a great aid to the shipping, viz.: Sturgeon Point light, on the west point of Lake Huron, about four miles north of Harrisville; Manistee light, on the east coast of Lake Michigan, at the entrance of Manistee river, and about 16 miles north of Grand Point au Sauble; Cana Island light, on the west coast of Lake Michigan, and about 15 miles SSW. from "Port du Mort" Channel; Mendota light, which is in Bete Grise Bay, Lake Superior, about 12 miles west of Keweenaw Point, and marks the entrance to the artificial channel, or cut, to Lac la Belle.

All of the above lights will be exhibited this spring except Mendota, which is not completed. Notice will be given when it is to be lighted.

The Eleventh District has seventy-nine lighthouses and beacons, ranging from the third to the sixth order, and usually lighted from eight and a half to nine months of the year.

The Grand Haven, Chicago, Milwaukee, and Sheboygan lights are exhibited the entire season, inasmuch as the navigation of lake Michigan is rarely obstructed by ice.

—The Dubuque *Herald* gives the following description of a peculiar river craft now in course of construction in that city:

Yesterday we had the pleasure of inspecting the model of a tug boat which is intended for the purpose of towing rafts upon the Mississippi. The dimensions of the steam tug will be as follows: 96 feet keel, 19 feet beam, and 3 feet in the hold. She will have two 9 by 18 inch cylinders, two 30 inch boilers 12 feet in length, and will further be geared with what is termed a core wheel, iron with wooden cogs. Further, the boat will be provided with two fair sized cabins; the after one will be 12 by 22 feet, and assigned to the accommodation of the officers and passengers; the other cabin, placed forward the boilers, will be 12 by 16 feet, and will be occupied by the crew.

The idea of passenger accommodation is decidedly a good one, and in the event of her being withdrawn from the towing branch of the business the boat can then be laid on the Chippewa river, where she can prove useful for the safe and easy transportation of passengers and freight.

The boat will be constructed of iron, not having a stick of wood inside, her deck beams being constructed out of iron, iron rudders, and no wood below her deck. We may add that her two engines will work up to seventy-five horse power. She will be of extremely light draught, drawing only twelve or fourteen inches of water.

Contributions.

ENGINEERING.

Definitions--Military, Naval and Civil Engineering--
Marine Constructions--Drainage and Irrigation.

BY BENJAMIN H. LATROBE, C. E.

[The following lectures upon "Engineering" were delivered at the "Peabody Institute of Baltimore" by the undersigned in the spring of 1869, and, being published in the present journal at the request of its editor, have been divided for the purpose into sections of suitable length, and such changes made in the style and statements as were proper to accommodate them to their new form, and to events which have happened since their delivery. They do not pretend to the character of scientific discourses, and if they have any merit, it is merely that of presenting a popular view of their several topics so classified and arranged as to afford to the general reader or auditor a sufficiently clear and comprehensive understanding of the subject, illustrated by facts of more or less general interest, although a few of them have local allusions to the city of which the undersigned is a resident, for which his distant readers will kindly make allowance.

The diagrams exhibited to the audience to whom the lectures were addressed cannot, of course, now accompany them, and more than this general reference to them is therefore omitted. BENJAMIN H. LATROBE, Civil Engineer.

BALTIMORE, April 2, 1870.]

FIRST SECTION.

The subject which has been selected by the Directors of the Institute as the one upon which I am to address you is "Engineering,"—a somewhat comprehensive word, and which, especially of late years, has had a meaning sometimes attached to it of which it has no reason to be proud, but which is, on the contrary, decidedly disreputable,—although, I am sorry to say, it is to be found in the dictionary. In the sense here referred to it has become, in popular phrase, almost synonymous with that sort of *management*, especially as practiced in political bodies, which is commonly known as "wire-pulling," or the species of manœuvring by which the selfish interests of cliques, factions, or individuals are promoted at the expense of the public good. This discreditable signification derivatively applied to the term by those who do not belong to a profession as honorable as it is useful, disparaging as it is, involves at all events a compliment to the skill required to accomplish its objects, as, in fact, no vocation demands qualifications of a higher order for its successful pursuit.

Passing this by, however, and speaking only of the more legitimate meaning of the word, it may be defined in its broadest sense to be "the science and art by which man is guided in directing the powers of nature to the attainment of his purposes."

Now as these purposes are infinitely varied in their character and object, so "Engineering" is divisible into many branches according to which it is called by different names, such as:

Military Engineering, embracing what is designed to facilitate attack and defence in the operation of armies on land;

Naval Engineering, including similar objects in maritime warfare and the improvement of the commercial marine;

Civil Engineering, which covers the planning and construction of out-door works of nearly every description, the purpose of which is to promote the material wealth, comfort and enjoyments of society in a state of *peace*.

This last division of the subject is susceptible of much farther subdivision, and, although not improperly applicable to all classes of construction by means of which the energies of nature are guided, stimulated, or kept in check by the genius and skill of man, yet the term has come to be more specifically applied to those operations by which the *transportation* of man and his productions from place to place is effected or facilitated.

It is to this department of Engineering that I propose to devote most of the time allotted to me, first touching briefly some of the leading topics connected with the other heads just mentioned.

Of *Military Engineering*, my limited knowledge will not allow me to say much; for, although the elementary sciences upon which it and civil engineering are founded are the same, their application, as seen in the class of constructions common to both, is essentially different. The late unhappy contest which distracted the country exhibited in our midst examples of some such works as are erected for the defense of a city against threatened invasion. Happily the dismantled ports which still crown our heights no longer bristle with cannon, but embellish their grassy mounds our parks and public walks, their presence chiefly to be regretted for the sad memories they recall. Would it not, indeed, in this view have been better to *demolish* than to *dismantle* them, for we read that the Thebans having conquered the Lacedæmonians and erected a brazen trophy in honor of their victory, a complaint was made to the Amphiction-

ic Council "that by that trophy the memory of their discord was made eternal," and the noble answer was, "Let it be destroyed, for it is not fitting that any record should remain of discord between Greek and Greek."

In modern warfare Military has borrowed from Civil Engineering important aid in the means both of attack and defense. Steam power upon rivers and railways has virtually multiplied armies by hurrying the concentration of troops and material; and the iron bars upon which they are transported have been used to render forts proof against the balls which granite walls could not resist. I should except the tremendous globes of iron hurled from the mouths of the enormous ordnance, now cast in our cannon foundries, one of which (the great 20 inch gun) was probably modeled after that in which our friend Baron Munchausen took the nap from which he was awoke by its discharge which buried him in the haystack across the river.

Naval Engineering I must notice almost as briefly as *Military*, although it has somewhat more in common with the principal subject of this lecture. The essential changes which the last few years have brought about in the structure, mode of propulsion and armament of vessels of war are due as much to the genius and skill of civil engineers as to those of professional ship-builders, as the improvements which have made them so much more formidable than before have related more to their machinery than to their models. The Merrimac with its railroad iron armor, the Monitor with its revolving turret and plated deck, and those multiform sea and river monsters, the "rams," with their pointed beaks and their turtle-shaped backs, from whose rounded slopes shot and shell glanced harmlessly, were mostly designed by men who had previously exercised their invention in works on *terra firma* and in times of peace.

The *merchant marine* has also owed its wonderful advance in a great degree to this class of engineers. Witness that stupendous specimen of naval architecture, the Great Eastern, planned by the celebrated Brunel, the *launching* of which exhibited almost as astonishing a display of mechanical contrivance and power as its construction. This vast ship, unprofitable as a commercial enterprise from its exaggerated size, has demonstrated the practicability and led to the construction of vessels of far greater capacity and speed than had ever before been attempted, or even thought of, and so promoted safety, economy and comfort unknown before in ocean navigation.

The steam engines which afford motive power to these sea-going vessels, and which, in their varied forms, are marvels of arrangement, strength and beauty of proportion and finish, are the designs of civil engineers devoting themselves to the mechanical department of the profession; and the screw propeller, which gives its name to the class of vessels in which it has superseded the paddle-wheel, owes its introduction to the projector of the *Monitor*. I say its *introduction*, rather than its *invention*, for the abstract idea of this mode of propulsion had occurred to more than the eminent man to whom its practical application was due, and I remember that, as far back as 1835, Captain Lewis Brantz, an able and estimable citizen of Baltimore, recollected doubtless by some of my audience, said to me one day that he wanted to stop *paddling*, and to *scree* the vessel along, and suited the action to the word as I now do.

There are also works upon *land* intimately connected with and auxiliary to the subject of naval engineering, which I will briefly refer to, as I could not treat of them at any length without encroaching too much upon the space which I propose to appropriate to what, I doubt not, will prove most interesting to my audience, the subject of "internal communications." The *Light House*, as you are aware, is an indispensable adjunct to ocean navigation, as without its spire-like shaft by day, and its starry beacon by night, no vessel could safely approach a coast, especially one like our own, where either shoals on the south, or rocks on the north, form its maritime boundary. If time permitted, many interesting details of this class of structures could be given, especially in reference to their *foundations*, whether upon insulated points of rock far out to sea, like those which support the "Edystone" and "Bell Rock" on the English and Scottish coasts, or upon the sands which sustain these edifices along our Southern Atlantic shore, or upon the fathomless mud of the mouths of the Mississippi, where long timber or iron piles driven or screwed deep into the soft alluvium, afford the only possible basis for the lofty column erected upon it. The forms of these sea pillars, particularly of those exposed to the ocean storms, which dash the spray to their very summits, exhibit great judgment and skill; while in the modern mode of lighting them, the science of optics has made the most brilliant display of its resources.

The *Breakwater* is another sea work of great importance to vessels seeking a temporary shelter upon a dangerous coast. It consists of embankments of heavy stone

thrown into the sea, and so placed as to protect storm-driven ships from the violence of the waves, while permitting their free ingress and subsequent egress when the danger is past. There is a good example of this description of work at the mouth of the bay of Delaware, just within Cape Henlopen, although inferior to that of Cherbourg and other European ports.

Harbors form another class of works connected with Naval Engineering which has always called for a high order of professional ability, as the operation of the currents of rivers and the tides of estuaries requires the most attentive study and the exercise of the soundest judgment and the most ample experience to meet the numerous difficulties which usually present themselves, and which often baffle the most consummate skill. The projecting works which have to be carried out to considerable distances from the shore in forming artificial harbors in exposed places, and which are known under the names of sea-walls, piers, moles, or jetties, demand the utmost care in their construction in order to guard against the undermining action of the water or their overthrow by the concussion of the waves. As even those of my hearers who have been upon the sea shore or across the Atlantic may have inadequate ideas of the power exerted by the waves of the ocean, I could interest them, if time permitted, by many examples of which a single one may suffice, (which I quote from Stevenson's work on Harbors), of a solid mass of rock six tons in weight and about nine feet in length, breadth and height, actually torn or *quarried out* by the waves of the German ocean from its bed upon the summit of an islet called the "Bound Skerry," forming the northeast point of the Shetland Islands, the top of which is seventy-four feet above the sea, or nearly half the height of the monument under whose shadow we are sitting.

In connection with *Harbors*, the construction of *Docks*, *Quays* and *Wharves* has taxed the talent of some of the ablest engineers in Europe and America and exhibits examples of the most massive and magnificent masonry that has ever been built. I might cite many works of this class, equally creditable to both countries, but merely to enumerate them by name and locality would give my auditors no idea of their character. It is only when the rise and fall of the tide is very considerable, as in the harbors of Northern Europe, that docks with gates to exclude or retain the waters are absolutely essential. In none of our own commercial ports is this the case to a sufficient extent to render them indispensable, although more or less inconvenience to vessels receiving or discharging their freights is, at times, experienced from extreme elevations or depressions of the water level. Our own harbor is happily more free from these than that of any of the Atlantic cities, owing to our greater distance from the ocean; while at the same time, our noble bay affords all the advantages of depth of water enjoyed by ports more immediately on the sea. The docks of Liverpool and London, in England, are superb examples of this class of construction for commercial purposes, called *wet docks*. While for the reason just stated the United States is deficient in these, it can point to some fine specimens of the *dry dock*, as those at New York and Portsmouth, Virginia, designed for the repair of vessels, especially those of the Navy.

In *Quays* or wharves we have little to be proud of in comparison with the chief European seaport cities, whose water fronts are lined by splendid stretches of granite wall, protected by cut stone parapets, and with stairways for the landing of vessels at all stages of the water. Our great commercial metropolis, New York, presents instead a sorry series of wooden piers, separating what are called, in a remnant we suppose of the dialect of her ancient Dutch dynasty, by the unpoetic name of "slips"—not inappropriately so called from the verdant slime which discolors the piles and planking of which the wharves are built. The costly works of Europe, it must, however, be borne in mind, are the slow-growing product of gradually accumulating commercial wealth; while our own rude and perishable structures, put together with a haste which of itself shows the rapid increase of the trade which called for them, will doubtless, in due time, be succeeded by erections which will vie with those of the Old World in stability and beauty.

The preceding remarks upon *Naval Engineering* embrace all that seems necessary to say of it in connection with my general subject, and I pass on therefore to speak of *Civil Engineering* in its more confined sense, as relating to and dealing with works entirely on *land*.

And first let me offer some observations upon one of the most important descriptions of work to which the Civil Engineer can be called upon to devote his talents, that of *Water Works* for the supply of that fluid, as vital to us as the air we breathe.

This name of Water Works is as familiar to my auditors as almost any household word of daily use in the family, and well may it be so in this good city of ours, for she took the lead of all her sisters in the introduction

of water for public use, as she did in that of some other things of necessity and luxury, as the gas which lights our halls, and the railways which bring us the coal from which it is distilled.

The wells, pools and fountains of the Oriental nations, and the aqueducts and baths, first of heathen, and afterwards the baptisteries of Christian Greece and Rome teach us that Water Works are things of most ancient date, as the water which supplied them had either to be raised from the depths of the soil or brought by artificial channels from the distant heights of the hills and mountains. The means used for these purposes were greatly inferior in mechanical appliance to those which more modern science and skill employ for similar objects. To say nothing of the primitive modes of these early times by which water was raised from a well or dipped from a pool, as compared with our modern pumping machinery, we see in the ancient *aqueduct* an evidence of what we might suppose to be ignorance of one of the first principles of hydrostatics, viz: that a liquid when confined will always rise to the height of its source. The Greeks, however, in Euclid and Archimedes had a mathematician and mechanic whose works are still in practical use among us, and they were fully acquainted with this principle. The use of pipes, also, for conducting water, was well known and frequently employed. The pipes, however, were not of cast iron, as with us, but either of lead or of pottery, and the great expense and perhaps the supposed deleterious effects of the former upon the purity of the water, and the deficiency of strength in the latter, together with their taste for architectural display, led those nations to prefer the conveyance of water from its far-off sources upon long lines of lofty arches, spanning deep and wide valleys or crossing extensive plains, rather than in covered conduits under the surface with far less of expenditure, but with no *show* of opulence and art. These arcades were sometimes in double and even triple tiers or stories, one above the other, and their remains are among the most magnificent memorials of the Past. There is one grand and beautiful work of this description in our own country, the High Bridge by which the water of the Croton is carried across the Harlem River into the city of New York, and which, although but one lofty story in height, will afford to such of my hearers as have seen it an example of the ancient aqueduct, as bold in design and as excellent in execution. The aqueduct of former days was however different from the one just described, in being a channel similar to a mill race; while the High Bridge, although capable of being made to perform its office of a conduit in the same manner, is used in fact as a supporter of the iron pipes of large caliber in which the water might have been carried down one slope of the valley and up the other with vast saving of cost, had not the public spirit and pardonable pride of our fellow-citizens determined to erect this noble monument to the wealth, enterprise and taste of the commercial capital of our country.

I could occupy much time, were it at my disposal, in the mere enumeration of the works by which the cities and towns of Europe and America are furnished with what in copious supply is so essential to the health and enjoyment of civilized life. For its peculiar and romantic interest, I may, however, refer to the one by which the practical, commercial people of Glasgow are enabled to drink the water of the celebrated Lock Katrine, which, if Scott had foreseen that it would be turned to so utilitarian a purpose, he might have hesitated to make the scene of the most beautiful of his poems, the "Lady of the Lake." In many instances, the want of elevated sources renders necessary the use of water or steam power to raise water to the reservoirs from which it is distributed, as in London and Paris and other European cities, and Philadelphia, Chicago, Cincinnati, St. Louis, New Orleans, and many others in this country, and as was the case in Baltimore until within a few years the construction of our present excellent works brought us by natural flow through our pipes the stream that winds through our city. It would be well indeed if our frequent and recently disastrous experience did not show that, although scarcely sufficient at times for the rapidly growing wants of our increasing population, it was at other times in such excess as to inundate our streets, destroy our property and endanger our lives by the floods which it pours into our harbor.

The *drainage and irrigation* of lands constitutes another branch of *civil*, called *agricultural* engineering, and not an unimportant one. It also deals with water as its element, but in a different manner from that described under the previous head. It is, so to speak, an humbler, or rather a more unpretending, department of the profession, because it requires no imposing structures to accomplish its objects, if we except one which is always a conspicuous feature, looming largely in the landscape, which is necessarily that of a level country, offering no obstruction to the currents of the atmosphere. I refer

to the *Wind Mill* so extensively employed in Holland to keep out the sea, below the tides of which lie its fertile meadow lands. It is also used in the marshy districts of England and other parts of Europe for purposes of drainage, and on our Western prairies may be seen at all the railway stations where water is to be elevated for use in their locomotives. These useful and picturesque structures, indeed, perform other work, but from the unsteady action of the power which propels their machinery, they are not so well fitted for any duty as for raising water; although of their ability to lift more solid bodies the valiant knight of La Mancha was painfully convinced when he ran a tilt against one of them under the delusion that he was attacking a giant. The undulatory surface and natural slope of most of the soil of the United States requires little artificial drainage, and there is comparatively a small area, and that almost wholly confined to our Territories beyond the Rocky Mountains, where irrigation is indispensable to agriculture. That water is a fertilizer in itself, even the purest water of our springs and brooks, is, however, so well established a fact, especially in the production of the grasses, that instead of being allowed to run to waste as at present, it may in any part of our country be diverted from the beds of the streams in which it flows and distributed over the upland fields, wherever their slopes are sufficiently gentle to permit this, and with vast increase of their productive power.

The mention of *drainage* suggests another department of *civil* engineering, and one of eminent importance, that of *mines*, but for the successful prosecution of which neither agriculture nor any of the arts of civilized life could flourish, as we should be without the metals from which our implements are made and the fuel with which they are moulded into shapes. *Mining* Engineering is, indeed, so distinct a branch of the profession that it is taught in the schools of science and art as quite independent of the rest, although the same elementary principles are the basis of all alike. I will therefore leave it with the remark that in treating of one of the subjects of Civil Engineering proper, viz: "tunnelling," I shall be handling a topic which has several points in common with it.

I should not omit to mention *Architecture* as a branch of Civil Engineering in its more enlarged sense, and in earlier times generally practiced by the same individuals. In later years, however, they have become quite distinct and independent professions, although still intimately related to and assisting each other in the various constructions in which they are concerned.

I have now touched, although lightly, upon various works with which the Civil Engineer may have to do in the practice of his profession, if he happens to be accomplished in all its branches; and I pass on to the principal subject of Civil Engineering, in the more limited sense already expressed as embracing the several means employed in the business of *transportation*, in treating which (excluding ocean navigation already referred to), I will speak in turn of the different works which contribute thereto in their respective positions and modes of operation.

(CONTINUED NEXT WEEK.)

THE DEPARTMENT OF RAILROAD ACCOUNTS.

Its Duties and its Responsibilities.

BY PAUL STORK.

In a former article I promised to explain how the department of accounts may be made an invaluable agent to insure efficiency, prevent peculation, and afford the Directory trustworthy information of the operations of the road; information that no other department is so peculiarly qualified to give, and which is so essential to enable the Board of Control to calmly and unprejudicedly judge of the wisdom and economy observed in the management of their property.

If the department is properly organized, its exhibits are especially conclusive for the following reasons:—

1st. Having no voice or influence in the management of the company's property, it has no opportunities to make the road a football to further private interests or speculations. It follows, therefore, that its sympathies, if left to itself, are at all times heartily enlisted in favor of the best interests of the company, and it cares nothing for the effect this or that showing will have upon the influence or prestige of any officer or class of officers.

2d. It has no power to authorize disbursements, and is consequently not responsible for extravagance in expenditures of any sort, nor for a falling off in receipts, no matter from what cause.

3d. It would not, then, permit the result of wastefulness or ignorance in any of the many different departments or branches of operations to be concealed under the guise of expenditures for purposes the cost of which can never be questioned, because no

one but those who compile the accounts are in a position to judge, even approximately, of their correctness.

4th. Should the pet projects of visionary or ambitious local managers develop loss to the company, there would be some guarantee that those who ought to know it would not be left in ignorance, or persistently misled by the manipulation of figures. Projects of every sort would then stand or fall upon their merits, and really productive branches of trade would not be made to suffer apparent diminution in order that the wisdom of the management might remain unquestioned.

The necessity of this is unquestionable, how, then, can it be brought about? By concentrating the accounts of every description—passenger, freight, operating, construction, equipment and general—into one department, thereby securing responsibility and economy, as well as avoiding unnecessary repetition of labor; by a determination upon the part of the directory to sustain the department; by a careful avoidance of an appearance of making it subordinate to the manager, for the sense of self-preservation is so strong that it is absurd to expect that a department will long remain independent in its action, if, through the folly of those who should uphold it, it feels that it is liable to be compromised or fatally misrepresented by its powerful neighbor; by granting to it such powers as are indispensable in the prosecution of its duties in collecting, examining and compiling the accounts of the company; by placing the department under an independent, energetic and experienced head, whom we will call a comptroller. By an experienced head, I do not mean a mere book-keeper—though a knowledge of book-keeping is indispensable—but a person possessing, if possible, a thorough knowledge of the road, clear-headed, and familiar with all the nice technicalities of railway accounts. The contemptible estimate in which the department of accounts is held upon our railroads is in a measure caused by its having been so long conducted under the supervision of double-entry book-keepers, weak-kneed parasites, and trimmers working in grooves, slaves to custom, whom a breath of the manager awakens into spasmodic life or paralyzes with abject fear. Although a thorough knowledge of book-keeping is essential, it is the least important of the many varied duties and acquirements a finished railway accountant should possess.

The plan we have sketched will prove ample to protect the directory from being misled by fictitious statements made by parties interested or under control. But the department, thus organized, has a broader and more useful field. One of the most important of its duties is the supervision and examination of station agents' accounts, and as dishonest men will continually creep in where so many are employed, adequate power should be delegated to the department to enable it to force the dismissal of agents found to be using the funds of the company for private purposes. To those not familiar with the workings of a railroad in all its branches, it might appear that the dismissal of a dishonest agent would follow, as a natural consequence, upon the first discovery of his guilt. But such is not always the case, for the reason that those having the appointment and dismissal of agents are generally interested mainly in the efficiency of certain branches of the service and are therefore morbidly sensitive about retaining those who are qualified to perform certain mechanical duties incident to the routine of station business, no matter what their other qualifications may be; and besides very able officers are sometimes so insanely jealous of their prerogatives that to be able only to suggest the dismissal of an incompetent or dishonest employe is to insure his retention beyond a question.

Whenever a defalcation is developed, the department should have the power to permanently suspend the delinquent agent until the matter can be thoroughly and impartially investigated and the facts placed before a high executive officer of the company for his decision. The re-instatement of an agent upon the ground that he had made good the shortage in his account should never be permitted. I have never heard of an instance where, if permitted to stay, the agent has not at some subsequent period proved a defaulter for an increased amount. It should also be a well understood and rigidly enforced rule that every agent who fails to make good his shortage should be proceeded against with the utmost promptness and rigor. The introduction and enforcement of so just and salutary a system as this would, in a few months, weed out the dishonest, strengthen the faltering, and encourage the remainder, who, it is a pleasure to say comprise an immense majority, and who are at once honest, capable and laborious. The person or persons having the personal examination of agents' accounts,*

* There are always more or less unadjusted balances at the stations made of uncollected bills and accounts due to and by the agents, and it is only by an examination made on the ground that their corrections can be verified.

should be entirely subordinate to the comptroller, otherwise their investigations soon degenerate into a mere farce, disgraceful to the company and demoralizing to the agents examined. This is so because no other person is in a position to know whether they perform their duty properly, or can furnish the data necessary as a basis for the examination, if it is to be searching, nor judge so correctly as to the general reliability of the different agents; for the never-ending routine of business keeps the department of accounts at all times advised of the financial status of each and every agency. The comptroller is therefore in a position to intelligently direct the examiners, to afford them valuable suggestions, and also to use them as a medium to secure greater efficiency and promptness in compiling and forwarding the station reports and accounts.

In addition to this necessary and desirable co-operation, the comptroller working with and through the examiner, with the light afforded by the carefully examined and verified reports of the agents on file in the department of accounts, is at all times advised of each bill remaining uncollected at every station, and whether proper energy and *finesse* is exercised by the agent in collection of outstanding claims for transportation services. The possession of this knowledge, and the exercise of it, drain the road each day of every surplus dollar in the hands of the agents.

Under this plan the responsibility for the faithful and prompt collection and remission of the company's revenues is fixed and concentrated, as it should be, in one department, under the person whose sources of information best qualify him to act with promptness and judgment; and he should be held to a rigid accountability for any loss the company may sustain from dishonest agents. From a merely superficial view of the subject, it might seem to be the business of the treasurer to attend to these details. A moment's thought, however, demonstrates the fallacy of it; for the only proper duty of the treasurer is to act as the custodian or agent in receiving the funds of the company as they are checked into the treasury or withdrawn from it upon approved bills or drafts; and no treasurer with an appreciative sense of the eternal fitness of things will ask or permit any greater responsibility or discretion to be added to his department. For the treasury, having the temporary charge of the immense revenues of the road, ought to be surrounded with checks and safeguards, and it is incompatible with even ordinary prudence or common sense to permit it to receive and disburse the funds of the company and at the same time act as the recorder or historian of its own transactions. The only account or book it should keep is the cash account book. All remittances made by agents and conductors should be made direct to the bank in which the company keeps its account, while a duplicate and triplicate remittance slip should be sent at the same time to the treasury and the department of accounts respectively. All balances due from railroad companies should be drawn for by the comptroller, payable to the order of the treasurer; and all drafts for balances due other roads should first be certified as correct in this department of accounts before being paid. The receipts given to individuals acknowledging the payment of debts due from them should be printed, "Not valid unless countersigned by the comptroller;" and no cash should be drawn out of the bank to meet petty bills and expenses except upon checks countersigned by him. Bills in favor of individuals, after being approved by the proper officer and entered in the department of accounts, should be placed in the hands of the treasurer. The payment of these bills, except those for insignificant amounts, should be made by check payable to order, signed by the treasurer and countersigned by the comptroller, and at the close of the day's business the bills should be examined and filed away in the department of accounts, after giving the treasurer a receipt for the same as having been paid. This system, while it grants the comptroller no power to defraud the company, at the same time secures a perfect and complete check upon the treasury—a thing now unknown—and renders the employment by it of more than one assistant a useless extravagance, even upon our largest roads. It is not a creditable truth, but it is a truth nevertheless, that there is not a railroad in the country upon which anything like a complete and thorough system of checks has been introduced and rigidly enforced between different departments. Wherever it has been attempted it has failed, partly from a want of knowledge of what is practicable and right upon the part of those who are really and deeply interested in securing it, and partly from the covert opposition, indifference, ignorance, prejudice, or interest of those who would be bound, or whose importance would be lessened, by such a system. And while it is impossible in this article or in a series of articles to do more than hint at a few of the many reforms and needful checks which are wanted, one more, affecting the traffic department, may be noticed here.

While the traffic tariffs of the company should be agreed upon and printed by the respective heads of the passenger and freight departments, subject to the approval of the manager, once made, the department of accounts, from its independence, its aptness for details, and its peculiar facilities, is the only organ to enforce them; otherwise the freight and ticket agents are entrusted with a power for harm that no other department possesses and that is positively frightful in its opportunities; and for this reason: upon no ably managed road can special or reduced rates be wholly dispensed with. Peculiar exigencies are continually arising which render an arbitrary tariff impossible. This being conceded, to what limit might not these exceptional rates be introduced by weak concessions or to further private ends, without a suspicion of the actual extent being known, even to the manager of the road; for nowhere except in connection with the accounts can the particulars of each item that goes to make up the whole be positively known, and no check is of any real or permanent value, unless it can be made absolute and independent of the control of the person interested. A proper system to adopt would be to have a duplicate (it can be a duplicate impression) of the manifest that accompanies each car or shipment of freight sent to the comptroller by the agent shipping the freight. The manifest should be carefully compared by the comptroller with the tariffs or authorized special rates. By this means, also, all mistakes arising from ignorance or carelessness upon the part of the agent may be discovered and corrected before delivery of the freight, after which it would often be too late to correct. While the theory of holding the agent responsible for the collection of the correct freight charges under all circumstances seems just and plausible, it is not so in fact; for many of them receive but a pittance for their labor, and are comparatively ignorant and uneducated men, who cannot master the voluminous classification and tariffs, or understand their nice and oftentimes obtuse analysis. The examination should be made, then, so that all errors may be detected and the receiving agent notified before the freight reaches its destination or is delivered. To complete the check upon the freight department, all bills vouched for by the freight agent in favor of individuals for rebates and overcharges, before being paid, should be examined in the department of accounts, and compared with the original manifest that accompanied the freight said to be shipped or charged at too high a rate.

The exercise of any of these important functions by the comptroller will create many bitter enemies. Indeed, an intelligent, persistent exercise of the limited and comparatively unimportant power possessed by what are now misnamed our auditors, is enough to concentrate upon them the insidious animosity, the unrelenting persecution, misrepresentations and sneers of the incompetent, the weak, and the designing, with their never-ending train of hungry and time-serving satellites. The President and Board of Control should, therefore, be wise in their choice of a comptroller, open and unqualified in their support of him.

THE JACKSONVILLE CROSSING.

Decision of the Injunction Suit of the Chicago & Alton and the Peoria, Pekin & Jacksonville Railroads.

[The following statement of the case concerning the tearing up of the "Y" tracks at Jacksonville has been contributed to correct an erroneous statement extensively published in the daily papers:]

Some time in the summer of last year, the Peoria, Pekin & Jacksonville Railroad Company, being about to complete its railroad to Jacksonville, negotiations were commenced between it and the Chicago & Alton Railroad Company as to the crossing of the tracks of the latter company. The St. Louis, Jacksonville & Chicago Railroad (leased by the Chicago & Alton Railroad Company) at Jacksonville, is connected with the track of the Toledo, Wabash & Western Railroad by two "Y" tracks on the north and south sides of the last named company's road. The Chicago & Alton Railroad Company endeavored by negotiations with the Peoria, Pekin & Jacksonville Company to so arrange the connection of that company with its own tracks, as to render it unnecessary to cross these "Y" tracks and that company made a verbal agreement with the Chicago & Alton Company to make its connection with its track at a point north of the north "Y." The officers of the Peoria, Pekin & Jacksonville Railroad subsequently changed their minds and were proceeding to cut the "Y" tracks of the Chicago & Alton road, when the latter company procured an injunction from the Circuit Court of Morgan County to prevent the threatened disturbance of its "Y" track. In violation of the spirit of this injunction, at an early hour in the morning, the "Y" tracks of the Chicago & Alton Railroad were forcibly taken up by persons professing to act under authority of the city of Jacksonville, and these tracks were destroyed, and the connection of

the Chicago & Alton with the Toledo, Wabash & Western tracks cut off. The Peoria, Pekin & Jacksonville Company immediately laid their tracks across the two "Y" tracks so destroyed and obtained an injunction in a neighboring county against the Chicago & Alton Company to prevent the latter Company from interfering with the tracks so laid down. Judge Hodges of the Morgan County Circuit Court, being a stock-holder and director in the St. Louis, Jacksonville & Chicago Railroad Company, refused to hear the case, and a change of venue was taken to the Sangamon Circuit Court, before Judge Edwards, when the Chicago & Alton Company asked for an attachment against the parties who had torn up their track. In the mean time the city of Jacksonville, which claimed that the Chicago & Alton Railroad Company had no right whatever to lay tracks in its streets, was made a party to the bill filed by that company, and the cause came on to be heard upon depositions and the report of Messrs. Carter, Gardner and Hjortsberg, three engineers appointed to report upon the rights of the parties in the premises.

The Court having heard the cause rendered the following decree:

THE CHICAGO & ALTON RAILROAD COMPANY vs. PEORIA, PEKIN & JACKSONVILLE RAILROAD COMPANY AND CITY OF JACKSONVILLE:—Bill for injunction.

And now on this day this cause came on to be heard upon bill, amended bill, the answers of the Peoria, Pekin & Jacksonville Railroad Company, with their exhibits, and the answer of the city of Jacksonville, replication to said answers; report of Commissioners, and depositions of I. Baker, C. M. Morrison, D. Mathers, Irving Dunlap, Leopold Wieland, and Wm. Hamilton, Jr.; and exhibits on file, and the ordinance of the city of Jacksonville; and the court being now sufficiently advised concerning the premises, it is ordered and adjudged:

1st. That the curved tracks constituting the "Y" near the junction of the St. Louis, Jacksonville & Chicago Railroad track with the Toledo, Wabash & Western Railway be restored as they were before their destruction on the 30th day of August, A. D., 1869, subject, however, to the crossing of said curved track by the track of the Peoria, Pekin & Jacksonville Railroad, as hereinafter set forth, and subject also to such change of grade of the rails of such curved tracks as are rendered necessary by said crossing, and the rights of the public to use the streets affected by said railroad tracks.

2d. That the Peoria, Pekin & Jacksonville Railroad Company shall have the right to cross said curved tracks at the place where their track now is and was laid on the 30th of August, 1869; said crossing to be made in such a manner as will best accommodate both roads; said crossing to be made under the direction of competent engineers.

3d. The expenses of the said crossing as well as the work necessary for adapting the curved tracks to the track of the Peoria, Pekin & Jacksonville Railroad shall be paid by the Peoria, Pekin & Jacksonville Railroad Company, and said crossing shall be maintained in the future by said Peoria, Pekin & Jacksonville Railroad Company.

4th. It is further decreed that the St. Louis, Jacksonville & Chicago Railroad Company shall have the right to maintain the said curved tracks constituting said "Y," and also the side tracks and switches crossing East State street, as the same were laid down and used by said company, or the complainant as lessee, at the date of commencing this suit.

In this decree the Court does not decide upon the rights of the St. Louis, Jacksonville & Chicago Railroad Company, or the rights of the Peoria, Pekin & Jacksonville Railroad Company, as to crossing any tracks of the St. Louis, Jacksonville & Chicago Railroad Company at any point other than the place where the track of the Peoria, Pekin & Jacksonville Railroad is now laid. And this decree is made subject to all the legal rights of the city of Jacksonville to regulate the use of all of the tracks of the St. Louis, Jacksonville & Chicago Railroad Company.

The costs of this suit shall be (except as to the proceedings for contempt) paid equally by the said complainants and the Peoria, Pekin & Jacksonville Railroad Company; and the proceedings in relation to the contempt are continued.

In thus adjusting the rights of the parties, it will be seen that the court decides that the Chicago & Alton Railroad Company have the right to maintain its tracks in the streets, and that the St. Louis, Jacksonville & Chicago Railroad Company must pay the expense of putting in and maintaining the crossings. At the same time the injunction obtained by the Peoria, Pekin & Jacksonville Railroad Company was dissolved, and the bill dismissed. The motion for attachment was not passed by the Chicago & Alton Railroad Company, and is still pending, having been continued by the court.

It is understood that the Chicago & Alton Railroad Company have commenced a suit in trespass against the parties who tore up their "Y" tracks, and that the suit will be vigorously pressed.

—The gauge of the London street tramways is four feet eight inches, and the charge for fare is one penny per mile. The cars are made to convey twenty-eight passengers on the outside and twenty-two inside, and are very elegant.

—Cox & Arnold, contractors, have obtained a judgment in the San Francisco District Court against the Western Pacific Railroad Company and Chas. McLoughlin, for \$195,000, with a lien on the road, for work performed.

—A correspondent of the London *Times* calls attention to the great number of American railroad bonds now offered in the English market. He advises investors to be cautious.

—A story is told of a Florida negro, who was so afraid of a railroad car, two years ago, that he had to be blindfolded to get him on a train, was elected to the Legislature. He is now a railroad Director.

General Railroad News.

OLD AND NEW ROADS.

Chicago & Rock River.

The Lee County Journal says that this road, which has its route from Amboy through Sandwich Plains, Bristol, Yorkville and Plainfield to Lockport, is to be built by a New York firm which agrees to secure to the company, or to the towns which have subscribed to it, a majority of the stock, guarantees a dividend of 2½ per cent. the first year on all stock subscribed by towns, and guarantees the payment of the interest on the bonded debt until the road is completed and turned over to the railroad company. The Journal adds: "The road is to be completed on or about the first day of July 1871, fenced, station-houses every six miles if required by the company, water-tanks, engine-houses, turn-tables, and everything necessary for a first-class road, with three hundred thousand dollars worth of rolling stock: the proportions and quality to be designated by the railroad company."

Bellefonte & Southern Illinois.

The contracts for building the road from its present terminus at New Athens, St. Clair county, to Duquoin, in Perry county, have been let. The road is to be completed by the 1st of October next. This will open a very direct narrow gauge route between St. Louis and Cairo.

Decatur & State Line.

Arrangements have been made to build the road, and engineers are now surveying the route.

West Wisconsin.

The terminus is at Augusta at present. Grading is progressing rapidly between Augusta and Eau Claire. The bridge over the Eau Claire is completed, and one over the Chippewa will soon be.

Prairie du Chien Bridge.

The temporary bridge of the Milwaukee & St. Paul Railway, between Prairie du Chien and McGregor, has been removed, and the ferry boats will be used again. The bridge has served its cost (\$20,000) several times this winter.

Louisville, New Albany & Chicago.

The New Track which connects this road with the Louisville Bridge and the Jeffersonville, Madison & Indianapolis Railroad is just completed.

Midland Pacific.

Otoe county, Neb., refuses to vote this road a subsidy of \$150,000, without which, the managers say, the road shall not be built another mile. This will be bad for the county, doubtless, but worse for the railroad, which will not be worth much if it extend only twelve or fifteen miles west of the Missouri.

Grand Trunk.

The list of applications for the second equipment mortgage bonds of this company, closed in London on the 17th ult. More than £1,300,000 was applied for, though only £228,000 was to be issued.

Pittsburgh, Canton & Chicago.

Canton, O., has subscribed \$245,000 for this road, of which \$105,000 was subscribed by C. Aultman & Co., the reaper manufacturer.

Rockford, Rock Island & St. Louis.

Muscotine has failed to raise the amount required to induce this company to build its road from Rock Island, down the river, to a point opposite Muscatine. Consequently, it is reported, the company will abandon the river route, and build from Camden, just below Rock Island, nearly due south, through Monmouth and Macomb, on the way to Beardstown. The company has already built a section of the river route, between Sagetown and Keithsburg, which thus becomes comparatively valueless.

Muskegon & Big Rapids.

The people of Muskegon propose to build a railroad from their town up the Muskegon river, through Newwaygo, to Big Rapids, where it would connect with the Grand Rapids & Indiana Railroad, and open Muskegon to the rest of the world.

Grand Rapids & Lake Shore.

The route of this proposed road is from Grand Rapids westward south of and nearly parallel to the Detroit & Milwaukee Road to Nunica, nine miles east of Grand Haven, where it will cross and run northeast, thence to Muskegon, 18½ miles. The Detroit Tribune says:

"This section of the road is under contract to be finished by June 1, 1870. An arrangement has been entered into between the Michigan Central, Grand River Valley and Detroit & Milwaukee Railroads, by which through trains will be run from Muskegon to Detroit and back as soon as the Nunica branch is completed, without any change of cars. When this is accomplished the Grand Rapids & Lake Shore Road will be pushed rapidly forward to Pentwater, nearly fifty miles north of Muskegon, and lying on Lake Michigan. Then in a year or

two more its promoters hope the road will be extended to Manistee and Traverse City, especially as all the counties along the line manifest a deep interest in the enterprise, and promise liberal aid."

Grand Rapids & Indiana.

The Grand Rapids (Mich.) Eagle of the 4th says: "We are informed by Mr. J. L. Williams that it is the intention to push the definite surveys on this work this season to Little Traverse Bay, making first a careful final location ready for construction as far as the Manistee River. The total distance from the end of the present contract, at Paris, on the Muskegon, is 120 miles, seventeen of which was located last season by Mr. E. B. Talcott. On the southern division, from Fort Wayne to Sturgis, the grading is nearly completed, large quantities of iron arriving, and tracklayers at work at both ends, with a prospect of meeting near Kendallville before June."

Beloit & Janesville.

This company proposes to build a road from Janesville to Beloit, which would probably be extended eventually to Rockford, and thus form a northern outlet to the Rockford, Rock Island & St. Louis Railroad. The incorporators are Hon. Wm. A. Laurence, Hon. Alexander Graham, Orrin Gurnsey, and Volney Atwood, of Janesville; Henry J. Strong and Charles H. Parker of Beloit, Wis., and J. A. Leland of Rockford, Ill.

Sababoo Air Line.

The company has formed a temporary organization with S. V. R. Apleman as President; T. D. Lang, Secretary; and R. M. Strong, Treasurer. When 500 shares of \$100 each have been taken, a permanent organization will be formed. The aid of the Chicago & Northwestern is hoped for, especially if it should again become a competitor of the Milwaukee & St. Paul.

Lawrence & Pleasant Hill.

This road is a species of Joliet Cut-off to Kansas City, shortening the route between Lawrence and St. Louis. The directors have renewed the contract with Mr. Maudeville for construction which was made and broken last summer. The contract calls for \$60,000 in cash in addition to the city and county bonds already voted. Of this amount \$30,000 was subscribed last summer, and the subscribers were to receive stock in the road. Since then Lawrence has voted \$60,000 more of bonds which are to be exchanged for cash subscriptions, the city taking stock in the road to that amount.

Detroit, Hillsdale & Indiana.

The Wyandotte Rolling Mills are to furnish the iron for the section of this road between Ypsilanti and Hillsdale, beginning this month, and delivering the last by the 1st of October. The company intends to have this part of the road in working order a month later. It is proposed to use the Jackson & Fort Wayne track from a point near Hillsdale for forty miles southwest. Thence to Logansport the old grade of the Eel River Valley road, which was partly finished years ago, is offered, and will probably be accepted. If so, the road can be completed to Logansport by July, 1871. Another project which the company is considering, is the extension of the road in a direct line from Hillsdale towards Springfield, Ill.

Denver Pacific.

Mr. D. W. Moffat, Treasurer of the Denver Pacific Railway Company, writes as follows to the editor of the Omaha Herald:

"I noticed in your paper some few days since that the Denver Pacific Railway had failed to sell its bonds in Europe, which is a great mistake, Doctor. I, being Treasurer of the road, can state that the Company has sold all of its first mortgage bonds, and has now cash in banks sufficient to complete and newly equip the road to Denver, where it would afford me much pleasure to meet you and — about June 1st, all the way by rail from Omaha."

Central Pacific.

The President offers a reward of \$2,500 for the apprehension of the person who set fire to the bridge at Sacramento over the American river. The drying house of the company at Sacramento was burned not long before, and \$30,000 is the estimated loss of that conflagration.

Kansas, Indian Territory & Gulf.

The House Pacific Railroad Committee agree to report a bill to incorporate with \$4,000,000 of capital the Kansas, Indian Territory & Gulf Railroad Company, to enable the Missouri River, Fort Scott & Gulf Railroad Company, and the Leavenworth, Lawrence & Galveston Railroad Company, both of Kansas, to unite upon a single track through the Indian Territory, to reach the Gulf. The directors and officers are authorized to meet in Boston. Nothing but the right of way is given in the bill. There are no land grants or money subsidies.

Des Moines Valley.

The bill taking from this company the land grant which it was to have for building north of Des Moines, has been defeated in the Iowa Legislature.

Iowa Falls & Sioux City.

The stations and distances on the part of the road built east from Sioux City are given as follows in the Sioux City Journal: Plymouth Center, 19 miles from Sioux City; LeMars, 35 miles from Sioux City; Remson, 35 miles from Sioux City; Marcus, 43 miles from Sioux City; Hazard, 53 miles from Sioux City; Cherokee, 60 miles from Sioux City. Cherokee is 75 miles from Fort Dodge.

South Pacific.

The Senate Committee on the Internal Improvements in the Missouri Legislature have unanimously agreed to report in favor of the passage of the South Pacific Railroad bill. This bill provides that the company shall be released from the indebtedness to the State of three hundred thousand dollars imposed on the company, at the rate of ten thousand dollars per mile for each mile of any branch it may construct to the main line of its road, or of the extension of the same from Franklin to St. Louis, provided the same shall be constructed before the first instalment becomes due.

Tebos & Neosho.

Bids for the construction of this road from Sedalia northeast through Boonville to Fayette in Howard county, were opened on the 28d ult. The following were accepted: The grading and masonry for road bed through Cooper county was awarded to Henry McPherson, of Boonville. From the Missouri river to Fayette, in Howard county, twelve miles, to Thomas Rimer of Knox county. In Pettis county, sections one to seven inclusive, to J. G. Nauman, of Pettis county. Work is to be commenced within fifteen days.

Lanesboro, Rochester & St. Paul.

The Southern Minnesota Railroad Company has obtained a law which authorizes it to build a road from Lanesboro, 51 miles west of LaCrosse on its present line, northwestward through Rochester to St. Paul.

Missouri, Kansas & Texas.

The route of this road has been fixed through Chetopa, a thriving new town on the Neosho, but a few miles north of the Indian Territory line. From the Advance of that place we learn that the place is to give \$75,000 in its bonds and 280 acres of land adjoining the town to secure the road. The road also runs very near Oswego some miles further up the Neosho.

Mr. R. S. Stevens, the President, in a speech at Chetopa said: "He presumed he betrayed no secret when he stated that Camargo on the Rio Grande was their objective point."

Houston, Trinity & Tyler.

A corps of engineers in charge of Mr. Converse commenced the survey of a route for this road on the 11th ult. Its course will be nearly due north from Houston, probably through Huntsville and Crockett to Tyler, which is about 90 miles west of Shreveport, and very well known in the North because of the prison which was there during the war.

Missouri River, Fort Scott & Gulf.

Baxter Springs, which is about two miles from the Indian Territory line and but seven from the Missouri line, has always counted confidently on securing this road through its limits. About two weeks ago the line was laid some miles west of it, and the people were informed that it could not go to Baxter. Thereupon a delegation was sent after Mr. Joy, who was on his way back to Boston, and after they returned the following telegram was received by Mr. Chanute, the engineer, from Mr. Joy:

"The conclusion of the board is to build the road by way of Baxter Springs, and all the forces must be at once transferred to that line, and the work pushed with all power. Do this instantly."

The distance from Baxter Springs to Girard, which is the point to which trains run now, is about 35 miles. Track is laid for some miles south of Girard, however, and nearly to Columbus.

The Leavenworth Tribune says: "The Missouri, Kansas & Texas Railroad, and the Missouri River, Fort Scott & Gulf Railroad are at present running a race to the southern State line. The latter road having been commenced more than a year since, has, or ought to have, a decided advantage over the former. At present it is difficult to predict which road will reach the goal first. Certain it is that Mr. Stevens has made such gigantic strides of late, that the Joy party, fearing defeat, have taken nearly all the men from the Leavenworth, Lawrence & Galveston Railroad, and placed them at work on the other road. This emulation will secure us, in a very short time, two roads to the southern extremity of the State."

St. Paul & Sioux City.

The St. Paul Press says that the St. Paul & Sioux City Railroad has been leased by the Lake Superior & Mississippi Railroad, and that the Jay Cooke & Co. interest have entered into obligations for the immediate completion of the road from St. James to Sioux City, a distance of 125 miles. St. James is about midway between St.

Paul & Sioux City, and about twenty miles beyond Chrystal City, the present terminus. The St. Paul & Sioux City Company will build this gap of twenty miles during the coming summer. The two roads will form a very direct line from Duluth to Sioux City, and in connection with the Sioux City & Pacific road will open a route from the Union Pacific to lake navigation shorter than those now existing from Omaha to Chicago.

St. Joseph & Denver.

Grading is progressing rapidly west of Hiawatha. Five miles are ready for the iron, which is on the way. A quantity of new rolling stock has been received for the forty miles now in operation and for purposes of construction. Messrs. Saxton & Hastings have the contract for laying the ties and track. Col. Thomas Harbine has been appointed Commissioner to select the new grant of lands lately voted by Congress.

Southern Minnesota.

This road was blocked up by the storms of the 11th ult. and up to the 1st inst. had not been cleared. Two locomotives were frozen up near Alden.

Waco Tap.

This is a branch of the Houston & Texas Central, to be built from Bremond, a station on the latter road about 140 miles above Houston, west 30 miles to Waco, which is on the Brazos river. A large part of the grading is done, and it is expected that the road will be completed within a year.

Cincinnati Southern.

Cincinnati does not despair of this road, notwithstanding the hostility of the present Kentucky Legislature. The City Council has granted the Trustees a loan of \$50,000 to defray the expenses of preliminary surveys.

Opelika & Oxford.

The Mobile Register says that a contract was closed on the 15th ult., at Opelika, Ala., for the construction of the first twenty miles of the Opelika & Oxford Railroad, commencing at the former place. It embraces the finishing of the road-bed, ready for the cars, and the erection of depot buildings, and was taken at \$22,000 a mile, by Messrs. Vischer & Lock, who themselves subscribe \$30,000.

Winchester & Strasburg.

The rails have been laid to Cedar Creek, Va., across which a temporary trestling is being built. Beyond this, to the junction with the Manassas Gap Railroad, the road-bed is ready for the rails, which will be laid, and the road ready for the trains by the 1st of April.

Martinsburg & Potomac.

The field work is to be completed to Martinsburg, Va., by the 10th of April; the proposals for construction ready by the 25th, and the contracts all made and the first spade put into the ground on the 1st of June next. Orders have been given for the immediate construction of the bridge across the Potomac to the point at which the location of the road will commence.

Tennessee & Pacific.

The Chattanooga Times says that track-laying will be commenced on this road within a few days. There is a sufficient quantity of iron already at Nashville to complete a mile and a half of the road. It will require 2,600 tons of iron to finish the road to Lebanon, which is east and not west of Nashville, as one might expect from the name.

The Stonewall Freight Line.

The cars of this new company are to be run over the Hopkinsville, Clarksville & New Orleans, the Evansville, Henderson & Nashville, Memphis & Clarksville, Mississippi Central and New Orleans, Jackson & Great Northern Railroads. Captain Frank B. Gracey, of Clarksville, is Manager.

Detroit, Howell & Lansing.

At a meeting of the stockholders of the Detroit & Howell Railroad Company, held at Detroit March 30, a proposition to consolidate the company with the Howell & Lansing Company was unanimously adopted. The articles of agreement provide that the two companies shall be merged and consolidated into and form one corporation under the name of the Detroit, Howell & Lansing Railroad Company, for the purpose of establishing and maintaining a continuous line of railroad from the city of Detroit to the city of Lansing.

California Pacific.

This company whose road extends from Vallejo, at the north end of San Francisco Bay, to Sacramento, proposes to build another line from Vallejo in a northwestern direction through or near Petaluma, Santa Rosa and Healdsburg, and perhaps to Sonoma.

California Southern Coast.

The articles of incorporation of this company were filed in the office of the Secretary of State of California on the 23d ult. Capital stock, \$20,000,000. The object is to construct a railroad from San Francisco to San Diego by the most available coast route, with a branch to intersect the Thirty-second-parallel Pacific Railroad, at or near the Colorado River. Directors: Don Juan Foster

M. J. O'Connor, William H. Sharp, A. F. Hinchman, J. B. Shaw, W. S. Rosecrans, L. C. Gunn, C. B. Polhemus, Benjamin Dreyfus, Edward J. Pringle, Edward Martin. At a meeting of the stockholders, held in San Francisco, the following officers were elected: General W. S. Rosecrans, President; M. J. O'Connor, Vice-President; Edward Martin, Treasurer; L. C. Gunn, Secretary.

New Haven, Middletown & Willimantic.

The work is now about completed between New Haven and Middletown, and is being pushed forward rapidly on the balance of the line to Willimantic, a distance of only 30 miles with so much vigor as to give assurance of early completion throughout.

South Florida.

The name of the incorporation which proposes to build this road is the Upper St. John, Mellonville, Tampa & South Florida Railroad Company. The route of the road is nearly straight across the peninsula from Mellonville, on the St. John river, 175 miles above Jacksonville, to Tampa, through a poor country very poorly inhabited. It might get a heavy freight in alligators, palmettos, or pitch pine, if there was a demand for such articles.

Union Pacific.

It is telegraphed from Cheyenne that notice of application for a Receiver of the Union Pacific Railroad has been given by creditors in the amount of one million dollars. A hearing is to be had before Chief-Justice Howe on the 9th of April. The bill gives a detailed statement of the way in which the road was built, declaring that there were immense frauds. A later Omaha telegram says in reference to this matter: "No creditors of the company have given such notice. The company owes no authenticated or ascertained debts in Nebraska, Wyoming, or Utah. It has paid and continues to pay all indebtedness when due. Davis, who is alleged to have given such notice, is not a creditor of the company now, and has suits in Nebraska against other parties for the claims referred to. The company claims that these proceedings have been instituted for the purpose of blackmailing the corporation under the laws surreptitiously put through the Wyoming Legislature at its recent session, which Congress is about to annul."

Lynchburg & Danville.

The City Council of Baltimore proposes to guarantee the bonds of this road to the amount of \$750,000, in order to secure its business for Baltimore. The road will be about seventy-five miles long, through a very hilly country, whose chief product is tobacco. It will make the route from Baltimore to the South much more direct than now, saving the detour by way of Richmond.

New Orleans & Texas.

The Houston Telegraph of the 26th inst. says: "The cars, it is expected, will be running to West Liberty by the first of May next. A hand car ran out to Beaumont the other day, and the reconnaissance states that though the culverts along the line are mostly destroyed, that otherwise the track is in much better order than was expected. The run in from Beaumont to Liberty, a distance of 43 miles, was made in 6¼ hours. The company are advertising for more laborers, and are seemingly determined to push on the work of reconstruction."

San Antonio & Mexican Gulf.

This road, which extends northeast about 30 miles from Port Llanca, near Indianola, to Victoria, Texas, is in the hands of the General Government, and is now managed by S. M. Woodward, of Indianola, who says it will be operated as long as it pays expenses.

Cairo & Fulton.

Congress has passed the bill extending the time for the completion of the first section of twenty miles of this road.

Danville & Indianapolis.

An official certificate of the formal organization and election of a Board of Directors of this company was filed in the office of the Secretary of State, at Springfield, last Thursday. It is to build the seven or eight miles of road east from Danville to the Indiana line, which will connect the Danville, Urbana, Bloomington & Pekin, with the road in Indiana, which will give it an outlet to Indianapolis. The whole line from Indianapolis to Pekin is known as the Indianapolis, Bloomington & Western Railway.

Winona & St. Peter.

From a late Minnesota telegram we learn that this company will have their bridge across the Minnesota, at St. Peter, completed, and the cars running into the town by the first of September next.

Houston & Great Northern.

The Houston Telegraph of the 27th learns that the balance of the six millions of stock has all been taken by seven men in New York:

"We heard the names of Messrs. Moses M. Taylor, W. E. Blair, James Hendricks, and two others. Five per cent (\$300,000) has been paid in. Engineers, and a con-

tractor from Chicago, are already here. A locomotive cars, etc., are on the way, and sixty miles are to be completed before Christmas. Dr. Young, the President of the Board, will be here to-day, and the Directors have a meeting on Tuesday next. A new era is dawning upon Houston, and Texas railroad building."

Two sets of engineers are already at work, making surveys of the line. The rich country along the proposed route can, undoubtedly, furnish sufficient business to make this one of the best-paying roads in the country.

Tallahassee Railroad Company.

A meeting of the stockholders was held at Jacksonville, Florida, on the 4th, to complete arrangements for a steamship line direct from that place to New York, and to extend their road from Tallahassee to Mobile. Mr. Littlefield has telegraphed from New York city to Jacksonville that he has completed arrangements to have the work of extending the railroad from Tallahassee to Mobile completed in twelve months' time from the 1st of April.

PERSONAL.

—It is reported that Garrett Van Wagoner, long Attorney of the Missouri Pacific Railroad Company, will retire on the 1st of May, and that he will be succeeded by Col. Leighton.

—J. K. Hornigh is Superintendent of the Nebraska Division of the Burlington & Missouri River Railroad, with headquarters at Nebraska City.

—Peter Ashcroft long Chief Resident Engineer of the Southeastern Railway, of England, died recently at the age of 68 years. Mr. Ashcroft stood at the head of his profession as an engineer of permanent way. He is succeeded by Mr. Francis Brady.

—Samuel Keefer, of Brockville, Canada, was chosen a member of the British Institution of Civil Engineers, on the 1st ult.

—The following notice was made by Thos. McKissock, on the 30th ult., in connection with the announcement of his appointment as Chief Engineer and General Superintendent of the Missouri Pacific Railroad:

"Having accepted the above appointment, notice is hereby given by me, that all present rules and regulations (including time-table No. 58), are continued in force till further notice, and the present officers of the road, in the Superintendent's Department, will continue to discharge their duties as heretofore, until otherwise ordered."

ELECTIONS AND APPOINTMENTS.

—On the 31st ult. Mr. McKissock, the new Superintendent of the Missouri Pacific, issued the following:

"Mr. Jacob Johann has this day been appointed master mechanic, vice B. Warren, resigned; to take effect April 1, 1870.

"Mr. Johann will have general supervision of the entire motive power and machinery department, and his authority will be respected and his orders obeyed by all employees in his departments."

Mr. Johann has been master mechanic of the road heretofore.

—Last week the new Directors of the Missouri Pacific Company elected R. J. Lackland, a prominent St. Louis merchant, as Vice President, and re-elected J. C. Porter, Secretary and Treasurer, and J. M. Cooper, Auditor.

—B. B. Glass has been appointed manager of the office of the Great Western Telegraph Company, at Davenport, Iowa.

—General Geo. P. Buell has been offered the position of Chief Engineer of the Memphis, El Paso & Pacific Railroad.

—James M. Walker, Esq., of Chicago, long Attorney of the Michigan Central and the Chicago, Burlington & Quincy companies was elected President of the Leavenworth, Lawrence & Galveston Railroad Company at a meeting of the directors on the 30th ult. Mr. James F. Joy resigned on account of the multitude of his duties.

—Mr. E. S. Chesbrough, who is now pretty well known throughout the world as "the tunnel engineer," has been offered a position as Chief Engineer of the New York Underground Railroad, which has lately been put under contract.

—Barney McKinney, long a steamboat man on the Arkansas river, has been appointed Purchasing Agent of the Little Rock & Fort Smith Railroad, with headquarters in St. Louis.

—At a recent meeting of the Board of Directors of the Chicago Rock Island & Pacific Railroad, Eleazer Cook, of Davenport, Iowa, was elected Vice President of the company. Commenting on this election, the Davenport Gazette says: In Mr. Cook are united, in rare degree, just the qualities and qualifications desired in its principal working officer by every successful railroad corporation—sterling integrity, great executive ability and unfaltering energy. These characteristics have rendered Mr. Cook, for years past, an invaluable officer of

the company: so that, while nominally acting as Secretary, he has really been discharging the onerous and important duties of Vice President, a position not heretofore formally created and filled by the Directors.

—On the 28th ult., the Omaha & Northwestern Railroad Company elected the following directors, to hold office until the first Monday in January, 1871: James E. Boyd, J. A. Horbach, E. Millard, A. Kountze, E. Creighton, Jonas Gise, J. A. Morrow, J. I. Redick and C. H. Downs. The officers elected were: President, James E. Boyd; Vice-President, John A. Horbach; Treasurer, Joseph H. Millard; Secretary, A. M. Mothershead; Hon. J. I. Redick was chosen Attorney for the corporation.

—The following officers and directors of the Omaha & Southwestern Railroad Company were chosen on the 28th ult.: President, S. S. Caldwell; Vice-President, Alvin Saunders; Secretary, A. S. Paddock; Treasurer, Enos Lowe. Directors, S. S. Caldwell, J. Y. Clopper, Clinton Briggs, Enos Lowe, Alvin Saunders, J. F. Mulloy, Jonas Gise, H. T. Clarke, and Smith Saunders.

—Geo. H. Crain, formerly Assistant Superintendent of the North Missouri Railroad, has been appointed Master of Transportation of the Pacific Railroad (of Missouri), headquarters, St. Louis, Mo.

MISCELLANEOUS.

—The opening of the Kharkoff & Taganroy Railroad establishes rapid and uninterrupted communication across the whole breadth of the Russian Empire. The two great parts of Russia, in the south-east, Rostock on the Don and Taganroy on the sea of Azoff—are now brought into close connection with such ports as Kharkoff, Koursk, Orel, Tulas and Moscow.

—The Spanish Government is about to make an effort to induce applications for concessions of seven new lines, viz., from Calatayud to Teruel, from Torralva to Soria, from Cadiz to Gibraltar, from Merida to Caceres, from Menigbar to Juen and Almeria from Salamanca to Zamora, and from Redondela to Pontevedra. Should any capitalists be induced to take up these lines, other projects now in the background will also make their appearance.

—Something over a year ago a passenger on the Harlem Railway found a pocket-book containing \$1,045, and gave it to the conductor for the company to try and find the loser. It was duly advertised, and as the owner made no response, the finder thought he should have it back again. The company refused to fork over, and he went to law about it. They contended that by their relation to the loser as passenger they were peculiarly responsible to him for his loss, and that whatever the finder's claim was originally worth he had lost it all the moment he gave the money to them. But the Court ruled that the finder was entitled to the property found as against all the world except the owner, and that no owner appearing he was entitled to a verdict in the case.

—Cable messages to and from Havana, Cuba, are now sent at somewhat reduced rates. For 10 words or less, counting address, date and signature, from any office of the Western Union Telegraph Company in the United States, east of the Mississippi river, including St. Louis, Mo., and excepting Key West, Fla., \$5. For each word over 10 words, 40 cents. For ten words or less, counting address, date and signature, from any office of the Western Union Telegraph Company, west of the Mississippi River, excepting St. Louis, Mo., \$7.50. For each word over 10 words, 75 cents.

—The bill giving State aid to several railroad projects—the Midland, the Buffalo & Washington, the Saratoga & Ogdensburg, and the Whitehall & Pittsburg—has passed both Houses of the New York Legislature. The amount appropriated is \$400,000.

—The railroad tariff bill was defeated in the Iowa Senate by a vote of 17 to 26.

The Philadelphia *Telegraph* says: "Since the completion of one railway across the continent and the commencement of several others, and the agitation in Congress of multifarious schemes in the old States, the railway kings have acquired a power in Washington scarcely less potential than that which they wield at the State capitals. As matters are now progressing, after a few years more have elapsed, there will be little or nothing for conventions and elections to decide except who shall be the subservient slaves of gigantic railway corporations, and these in turn will be so thoroughly interlocked and consolidated that their entire policy will be prescribed by less than a dozen of the leading railway men of the country."

—The Galveston *News* says that Mr. A. R. De Lareintrie advertises the opening of the books in Baltimore for subscription of stock in the Baltimore & Texas Steam Transportation Company, for the direct transportation of general freight between Baltimore and the ports of

Texas. The steamers of the line are to be provided with Tellier's Refrigerating Machine, which is guaranteed to keep meats, fruits, etc., in perfect condition, in any climate, by means of cold air, without the use of ice. A practical man is said to be ready to superintend the beef business for this projected line of steamers in Texas.

MECHANICS AND ENGINEERING.

—The Mont Cenis tunnel works continue to make tolerable progress. In the first half of February, the distance pierced was 173ft. 2in., or at the rate of 246ft. 4in. per month. The whole distance remaining to be pierced at February 15, 1870, was 4,875 feet; it follows, then, that if the present rate of progress can be maintained, the tunnel will be completed in the course of June, 1871. The masonry work, laying of way, etc., would absorb some little time, but there appears no reason why trains should not be running underneath Mont Cenis before the close of next year. If this result is attained, the execution of the tunnel will have extended over about fourteen years altogether. We may recall the fact that that it is proposed to carry the Anglo-Indian mails through this great tunnel.

—A new railway bridge, nearly a mile long, has been built across the river Daieper at Kieff. It was opened with great ceremony on the 13th ult. by the governor of the town, in the presence of the chief military and civil dignitaries. This bridge is the last link in the railway communication between the Baltic and the Black Sea, which will be complete as soon as the Kieff-Balta line is opened.

—D. Blanchard, of Green Point, N. Y., has invented and is now manufacturing a ruler which supplies a want long felt by mechanical draughtsmen, viz., some convenient means of moving the ruler for ruling lines at corresponding or uniform short distances apart. This ruler is composed of two principal pieces, one of which carrying a springing-pawl lever, lies stationary on the drawing or board, while the other, made of two adjustable limbs, is moved a distance corresponding with the spaces between the lines to be ruled, by the action of the pawl of the aforesaid lever, produced by the draughtsman simply pressing his finger on the said lever after every ruling of a line, and producing an action of its pawl on a ratchet on one of the adjustable limbs. The distance moved by the ruler and corresponding distance between the ruled lines is regulated by adjusting one of the adjustable limbs relatively to the other.—*American Artisan*.

—The *Engineer* says that the iron sleepers on the Great Indian Peninsula Railway are found to last much longer than timber sleepers. The company have been replacing with iron the jungle sleepers, which are found to rot rapidly in the soft ballast. In passing over bridges and hard rock, they find that Norway timber sleepers, creosoted, are the best; and iron sleepers for other places, instead of the native timber formerly used.

—Two Welch inventors, C. E. Spooner and G. A. Hudart, combine their efforts in the production of a rail joint, which they describe as consisting in securing the abutting ends of the rails, whether they be double-headed or formed with a flat base, between two plates suitably shaped to embrace the web and the foot or lower head of the rail, and of such depth that when applied they will extend vertically a sufficient distance below the rail to form a girder or stiff rib, and admit of being secured by spring clamps or otherwise.

TRAFFIC AND EARNINGS.

—The report of the Northern Central Railway (Baltimore, Md., to Canandaigua, N. Y.,) for the year 1869 is published.

The earnings of the company, including the main line and branches, were \$4,308,783.54, made up as follows:

From Freight	\$2,968,333 08
From Passengers	967,978 16
From Express	80,938 30
From United States mails	38,507 50
From sundry sources	249,277 71

The expenses were:

For conducting transportation	\$1,011,501 15
For motive power	882,495 56
For maintenance of cars	283,943 60
For maintenance of way	767,334 24
For general expenses	72,207 33

Total expenses.....\$3,016,980 88

Net revenue.....\$1,291,802 66

The length of the lines owned or leased and operated by the company is 330 miles.

—The earnings of the Terre Haute & Indianapolis Railroad during the year 1869 were \$1,270,043.32, being an increase of \$96,657.36 over the preceding year.

—For the week ending March 11, the earnings of the Great Western of Canada (334½ miles) were:

1870.....	\$17,333
1869.....	12,305

Increase (40½ per cent.).....\$5,028

—The earnings of the Grand Trunk Railway of Canada (1,377 miles) for the week ending March 12, were:

1870.....	\$26,500
1869.....	18,800

Increase (61½ per cent.).....\$7,700

—Already a representative of a well-known lake steamboat company (Leopold & Austrian) has been negotiating with the Lake Superior & Mississippi Railroad Company, for the transportation of coal and iron, brought by steamers from Pennsylvania to Duluth, to St. Paul. Minnesota is likely to get its supply of these heavy articles almost wholly by this route, after this spring.

—The aggregate receipts of all the French lines in 1869 have just been officially returned at £27,503,159, as compared with £26,090,029 in 1868, showing an increase of £1,413,130. The average distance worked in 1869 was 10,368½ miles, as compared with 9,910 miles in 1868, showing an average increase last year of 358½ miles. Of the average of 10,368½ miles worked last year, 9,908½ miles were in the hands of the six great companies—the Northern of France, the Eastern of France, the Western of France, the Orleans, the Paris, Lyons and Mediterranean, and the Southern of France. It follows that only 365 miles were in the hands of small independent companies. The monopoly, or to use a milder term, the combination system has thus not yet been seriously assailed in France. The whole extent of new line brought into operation last year in France was 445 miles, the greater part of it being completed towards the close of the year.

—It is said that travel from Corinne to Montana has increased to such an extent that Gilmer & Salisbury's stages are inadequate to transport all the passengers going to the mines, and a train of wagons fitted up by private enterprise is about to start for Helena.

New Bonds of the Pennsylvania Railroad Company.

The following circular has been issued from the office of the Pennsylvania Railroad Company, dated March 1, 1870:

Under authority of an act of the Legislature of Pennsylvania, approved March 22, 1867, and accepted by the stockholders of the Company at their annual meeting on the 30th of April following, the Directors of the Pennsylvania Railroad Company have caused to be executed a mortgage of all their railroad from the City of Philadelphia to the City of Pittsburg, together with all its branches, the personal property and real estate used in connection therewith, to Wistar Morris and Josiah Bacon, of Philadelphia, in trust, for the sum of \$35,000,000—the amount of capital stock authorized by the charter of the Company—of which \$33,493,112 50 is now outstanding.

The bonds secured by this mortgage are issued to the trustees above named, who cannot, under its provisions, deliver to the company at any time an amount exceeding the capital stock of the company paid in.

Of these bonds (of \$1,000, or £200 sterling) 17,035 bonds will be issued by them only to retire or to exchange for the existing liens upon the property of the company enumerated below:

1. First mortgage 6 per cent. bonds on the road between Harrisburg and Pittsburg, due Dec. 31, 1880.....	\$4,973,000 00
2. Second mortgage 6 per cent. bonds on the road between Harrisburg and Pittsburg, due March 31, 1875.....	4,880,940 00
3. Five per cent. bonds held by the State of Pennsylvania, being a lien on the road from Philadelphia to Columbia, paid off at the rate of \$400,000 per annum, extinguishing this debt in 1891.....	6,082,528 14
4. Six per cent. debentures due 1871, convertible into general mortgage bonds.....	1,114,334 00
Total.....	\$17,035,000 14

The payment by the company of the above indebtedness—to meet which at maturity it now holds ample means, independently of the bonds to be reserved by the trustees for that purpose—makes the bonds created under this general mortgage, virtually a first lien upon all its railways, their equipment and real estate, &c., &c.

The trustees have delivered to the company up to January 1, 1870, 7,020 of these bonds, all of which have been sold, leaving 8,883 still deliverable under the conditions of the mortgage, exclusive of 17,035 bonds retained to meet prior liens upon its railway.

It is proposed to issue at this time 2,000 bonds of \$1,000 each either in the form of coupons or registered bonds, at the option of the purchaser. These bonds bear interest at the rate of six per cent. per annum, payable half-yearly at the office of the company, in the City of Philadelphia, on the 1st of January and on the 1st of July, on the coupon bonds, and on the 1st of April and the 1st of October on the registered, each issue free from all State taxes.

—The Union Steamboat Company will run 26 propellers this season. Of these, the Arctic and Pacific will be on the Lake Superior route again. The boats in the line between Buffalo and Chicago, which make this city one of their ports, are the Jay Gould, St. Louis, Colorado, Nebraska, Wabash, Canisteo, Dean Richmond, Roanoke, Wenona, Passaic, and two new propellers, one to be built at Buffalo and one at Cleveland. The boats in the line between Buffalo and Detroit will be the Atlantic, Olean, Eclipse, Tioga, Guiding Star, Galena. Of the above vessels, the Arctic, Pacific, St. Louis, Wabash, Passaic, Atlantic, Olean, Tioga, and Galena will have all the requisite accommodations for passengers.

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THIS IS BY FAR

The Cheapest Advertising

EVER OFFERED.

Parties desiring extensive Advertising in the
West and Northwest, are invited to avail themselves
of the unusual facilities of the undersigned for in-
serting advertisements in TWO HUNDRED

LEADING COUNTY PAPERS.

For further particulars, call upon or address the
proprietor of this paper,

A. N. KELLOGG,

99 & 101 Washington St.,

CHICAGO, ILL.

To the Iron, Steel & Metal Trade — AND — MANUFACTURERS.

It is our intention to publish in a few weeks, a Directory of the Iron, Steel, Hardware and Metal Trades and their collateral branches of business; it will embrace a complete list of the Manufacturers, Importers, Wholesale and Retail Dealers, Jobbers, Commission Merchants, and Brokers of Iron, Steel, Shelf and Builders' Hardware, Tools, Agricultural Implements, Machinery, Stoves, Castings, Wire, Tinman's Supplies and Tools, Railway, Steamboat, Machine and Carriage Makers' Supplies, Saddlery Hardware, Safes, Locks, Steam and Gas Fittings, Cabinet Makers' and Undertakers' Trimmings, Fire Arms, Cutlery, Plumbers' Materials, and

All Goods Manufactured in Whole or in Part from the Baser Metals.

It will also contain a full list of the Machinists, Iron Founders, Brass Founders and Finishers, and Copper Workers in the United States and Canada, and shall be as complete and reliable as it is possible to make a work of this character. The book will be printed on heavy tinted paper, and will make a volume of five hundred large quarto pages, bound handsomely and substantially in cloth with embossed covers. The information will be arranged by States, giving cities and towns in alphabetical order, and classified under all the business headings relating to the several departments of the trade. To which will be added a copious index, rendering all portions of the work of easy reference. We have the honor to request you to

MAIL US ONE OF YOUR BUSINESS CARDS,

That we may report you correctly, and place you under your several appropriate business headings; this favor you certainly can grant us without any expense.

If convenient, to give us the address of the Machinists, Iron Founders and Metal Workers and dealers in your city and vicinity.

To interest yourself in a work which is being published for the benefit of your line of trade, and which must be a great convenience not to say necessity, to all parties who sympathize with the Iron, Steel and Metal interests of our country. The publication of such a work, of course involves a heavy expense, but having received repeated assurance that there was need of such a work, we began the necessary canvass for it, trusting to the well known liberality of the important interests the work will represent for our support. The patronage we have received from the extreme Western and Southern States, the Territories, and the Pacific Coast has encouraged us beyond our most sanguine expectations. We now have the honor to ask the Merchants and Manufacturers of the Atlantic States and the great business centres, to give their support to a book that must be invaluable to every one in the trade.

Our terms of advertising are: **SIXTY DOLLARS PER PAGE**; Thirty-five dollars one-half page; Twenty-five dollars one-third page; Twenty dollars one-quarter page; Fifteen dollars one-eighth page; Twelve dollars one-twelfth page; *payable upon publication and includes of a copy of the work.* The size of the page will be about 13x10 inches.

The Subscription Price of the Book will be **FIVE DOLLARS**, delivered post free, payable upon Delivery.

SYMONDS, WENTWORTH & CO., Publishers,
19 Central St., Boston, Mass.

Geo. C. Clarke & Co., FIRE & MARINE INSURANCE. No. 15 Chamber of Commerce.

GEO. C. CLARKE.

SAM'L M. NICKERSON.

AGENTS FOR

New England Mutual Insurance Co., of Boston,
ASSETS OVER \$1,140,000.

American Insurance Company, - - of Boston,
ASSETS OVER \$820,000.

Independent Insurance Company, - of Boston,
ASSETS OVER \$500,000.

North American Fire Ins. Co., of New York,
ASSETS OVER \$770,000.

Excelsior Fire Insurance Co., - - of New York
ASSETS OVER \$840,000.

Fulton Fire Insurance Company, of New York,
ASSETS OVER \$810,000.

CHAS. J. PUSEY,

P. O. Address—Box 5222.

EDW'D H. PARDEE.

Pusey & Pardee,
74 BROADWAY, NEW YORK.

**American and English Rails,
LOCOMOTIVES AND CARS, FISH-PLATES, SPIKES, &c.**

—SOLE AGENTS FOR—

**Atkins Brothers' Pottsville Rolling Mills, and G.
Buchanan & Co., of London.**

Special attention given to filling orders for small T and STREET RAILS, of every weight and pattern.

OLD RAILS BOUGHT OR RE-ROLLED, AS DESIRED.

BAKER'S PATENT Car Warmer!

A most simple, safe and economical arrangement whereby the entire car, and especially the feet of the passengers are warmed as they sit in their seats.

It is attached to a car without lessening its capacity for holding passengers; while the ordinary arrangements of stoves take up the room of eight passengers. The saving in space is thereby more than the cost of the Apparatus.

It is absolutely proof against all danger from fire, in case of accident to the car.

It is a most substantial and permanent fixture—requiring no removal.

It requires very much less fuel than any other mode.

It allows the brakeman on the trip his full time to answer the call of the whistle.

It warms the car AT ALL TIMES, and does not, like several other arrangements, only warm when in motion.

It holds the heat constantly close to the floor of the car; while, at the same time, it allows sufficient warmth, and the most thorough and even ventilation in the region of the head, that a railroad car is susceptible of. No other plan admits of the lower part of the car being warmed, with ventilation at the same time above.

The Apparatus is now in use on the following named railroads:

**New York Central,
New Haven, Hartford & Springfield,
Hudson River,
Chicago, Rock Island & Pacific,
New York & New Haven,
Pullman Palace Car Co.,
Boston & Albany,
Taunton Branch,
 Erie Railway,
Long Island,
Mich. Southern.**

Without a single exception, the numerous railroad and scientific men who have examined it, speak most approvingly of the plan. Further particulars furnished on application to the manufacturers.

**STEAM AND WATER APPARATUS,
For Warming and Ventilating all
Kinds of Buildings.**

BAKER, SMITH & CO.
149 & 151 Greene St., New York.
127 Dearborn St., Chicago.

J. CARETTI.

L. RUSCI.

**Caretti & Rusca,
ITALIAN
FRESCO PAINTERS!**
162 East Madison St.,
ROOM 24.

Public and Private Buildings Decorated in the Most Artistic Style.

Refer to Messrs. Austin & Boal, 231 and 233 South Water Street; A. N. Kellogg, Editor WESTERN RAILROAD GAZETTE.

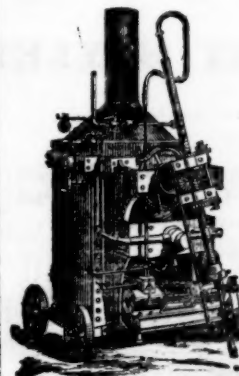
**WALL PAPERS!
WINDOW SHADES, &c., &c.**

A choice and superior stock of the finest imported WALL PAPERS and WINDOW SHADES, for sale at REDUCED PRICES, at

No. 89 Randolph St.
Orders from the city or country for Paper Hanging, Calcimining, House Painting and Graining promptly attended to. The best workmen employed and satisfaction guaranteed.

F. E. RIGBY, Jr.

LESCHOT'S PATENT DIAMOND POINTED STEAM DRILLS! — FOR — RAILROAD GRADING.



The unequalled efficiency and economy of these DRILLING MACHINES are fully established, and they are fast superseding all other inventions for **ROCK DRILLING**. They are constructed of various sizes and patterns to suit different classes of work, being adapted to Channelling and Girdling in quarries; to shafting, tunnelling, prospecting and all open cut work in mines; also to heavy Railroad-grading and Sub-marine Blasting. They operate noiselessly without percussion; and produce a perfectly cylindrical hole of uniform diameter. Their usual rate of boring is three to five (3 to 5) inches per minute in hard rock; eight to ten (8 to 10) inches per minute in slate and sand rock, and eighteen to twenty-two (18 to 22) inches per minute in coal. TEST CORES, in the form of solid cylinders of rock or mineral may be taken out of mines from any depth—not exceeding one thousand (1,000) feet—showing the geological formation, character of mineral deposits, &c. These drills never need sharpening and no steel is consumed in boring—as the cutting points (composed of rough, uncut diamonds), are practically indestructible. Boilers, Engines, Steam Pumps, and all necessary tools furnished with drills. Illustrated circular sent on application.

SEVERANCE & HOLT, Man'rs,
Office, 16 Wall Street, NEW YORK.

Gilbert Hubbard & Co.



**SHIP CHANDLERS,
AND DEALERS IN
TWINES & CORDAGE.**
205 & 207 S. Water St.,
CHICAGO.

We would call particular attention of the Trade to our stock, as we at all times have the largest and best assortment in the West, of

**Cotton and Flax Duck, all Widths,
DITCHING ROPES,**

MANILLA & TARRED ROPE

Bags, Bagging, Burlaps, Canvas, Oakum,
Tar, Pitch, Tackle, Blocks, Chains, Coal Tar

**Roofing Pitch, & Felting,
WIRE ROPE,**

Either IRON or STEEL for Mining, Hoisting, or Ferry purposes.

**TENTS, OF EVERY KIND!
TARPAULINS, AWNINGS,**

Wagon Covers,
Of Plain or Rubber-coated Duck.

FLAGS!
Of Silk or Bunting, as per Army Regulations, constantly on hand or made to order.

**SEWER PIPE, DRAIN TILE,
Bath Brick & Fire Brick,**

Manufactured and Sold by

THE JOLIET MOUND CO.,
Joliet, Will Co., Illinois.

**Office & Yard in Chicago,
Corner Wells and Polk Sts.**

Orders and inquiries promptly attended to.

JOLIET MOUND CO.

TO RAILWAY MANAGERS!

Consult the interests of your Company, by purchasing **PIERCE'S ELASTIC RENEWABLE RAIL FROG AND CROSSING**. The cheapest, best and most durable yet introduced. Examine the cuts and specifications, for particulars. All Frogs and Crossings of this device warranted to give satisfaction. Orders promptly filled. Address as below. Specifications of

PIERCE'S ELASTIC RENEWABLE Railway Frog and Crossing.

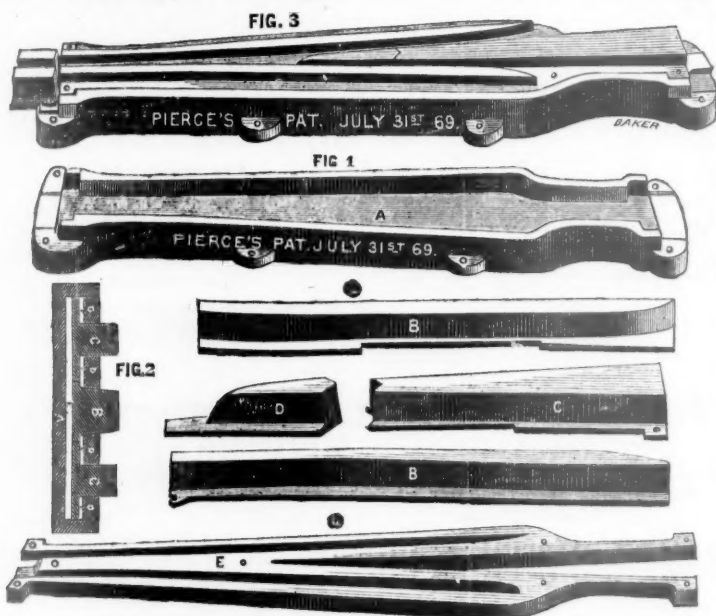


FIG. 1.—A. Permanent Bed Plate, Cast Iron.
B.B. Guard Rails, Cast Iron, wearing surface chilled, (can be made of steel if preferred.)
C. Base of point, Cast Iron, with chilled surface, or Steel.
D. Point, of Cast Steel.
E. Cap, of either Cast or Wrought Iron.
FIG. 2.—Cross Section. A. Bed Plate. B. Base. C.C. Guard Rails. D.D.D.D. Cap. E. Wood packing half-inch thick. F.F.F.F. Wood packing, quarter-inch thick.
FIG. 3.—Shows the Frog complete, with all its parts adjusted ready for laying down.

THE ADVANTAGES claimed for this Frog are in brief: First—The permanency of the bed plate, on which there is no wear. Second—The durability of the Guard Rails, base and point, and the ease with which they can be renewed. Also, the elasticity which is given by the packing, avoiding the rigidity of the Solid Frog. Third—The bed plate being once in position, does not require to be taken up to produce a new Frog, as the wearing surfaces (Guard-rails, base and point) are renewable at pleasure. Fourth—The Cap is adjustable and easily removed for the purpose of renewing any of the worn parts, and can be done in ten minutes time by two men. The Guard-rails, point and base, being held in position and fastened by the Cap. By this device a new Frog is produced at about one-third the original cost. Fifth—It is not necessary to take up or move the connecting rails with the Frog for the purpose of renewal. It does away with the interruption to passing trains and the labor incident to replacing the old form of Frogs. Many other points of excellence and economy might be adduced which it is not deemed necessary to enumerate, believing that a practical examination or test by Railroad Managers will bring out its qualities and prove its usefulness.

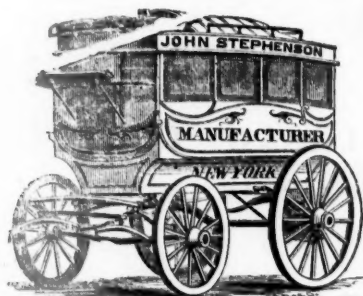
PRICE LIST.

[POINT OF CAST STEEL, BASE AND GUARD RAILS OF CHILLED IRON SURFACE.]

No. 1.—6 Foot Frog about 7 degrees,	\$85.00	Base, \$8 each.
" 2.—5 1/2 " " " 8 "	\$85.00	Point, \$10 each.
" 3.—5 " " " 9 "	\$82.00	Guard Rail, \$8 each, or Full Set, \$30.

Other sizes that may be desired, or renewable parts of Cast Steel, furnished at proportionate rates.

SHERMAN, MARSH & STEEL, Manufacturers and General Agents,
OFFICE, 91 WASHINGTON ST.,
CHICAGO, ILLINOIS.



OMNIBUSES

—OF—
EVERY STYLE!

Orders Promptly Filled.

CARS,

LIGHT, STRONG

—AND—

ELEGANT!



Important to Railway Companies!

The following, which we take from one of our exchanges, is but an illustration of how much money railroad companies are and have been paying for the old-style baggage-check, and how easy it is for them to be daily purchasing baggage-checks, until they amount to millions ere they are aware of the fact:

"A Rash Promise.—A paper tells the following story of a young lady who is a pupil at one of the schools in this city, and who has already, it seems, beaten her father at mathematics. She modestly proposed that if her father would give her only one cent on one day, and double the amount on each successive day for just one month, she would pledge herself never to ask of him another cent of money as long as she lived. Father-familias, not stopping to run over the figures in his head, and not supposing it would amount to a large sum, was glad to accept the offer at once, thinking it also a favorable opportunity to include a possible marriage dowry in the future. At the twenty-fifth day, he became greatly alarmed, lest, if he complied with his own acceptance, he might be obliged to be 'declared a bankrupt on his own petition.' But at the thirtieth day, the young girl demanded only the pretty sum of \$5,308,719 12. The astonished merchant was only too happy to cancel the claim by advancing a handsome cash payment for his folly in allowing himself to give a bond—or his word he considered as good as a bond—without noticing the consideration therein expressed, and by promising to return to the old custom of advancing smaller sums daily until otherwise ordered."

In comparing the above with the cost of baggage-checks, it is well known by every baggage-man that to supply a road perfectly with checks, it is necessary that the baggage should have on it a check which, of itself, indicates the station for which the baggage is destined; it is not, the baggage-check is not perfect or complete. As every intelligent person can conceive at a glance, to bring the checking of baggage to such a state of perfection with the old style of baggage-check would cost an immense amount of money, as per example: We will take the New Jersey Railroad; we will say that it has twenty stations; it will require one thousand checks from New York to Newark, one thousand from New York to Elizabeth, one thousand from New York to Rahway, one thousand from New York to New Brunswick, and so on to the whole twenty stations. Then we again commence with one thousand from Newark to all stations, one thousand from Elizabeth to all stations, and so on until all stations are supplied, then we have just commenced; as other stations are added, and other connections made, all this must be done over and over again, and there is no help for it so long as railroad companies continue to use the old-style check and system of checking baggage. The next question is, how to obviate the necessity of purchasing this immense amount of baggage-checks? Simply by adopting the Thomas Safety Baggage-Check and system of checking baggage. By its use, it matters not how many different stations are opened, or how many connections are made, the one check will go to every one of them, and, by so doing, save tens, if not hundreds of thousands of dollars to railroad companies, and, at the same time, obviate the necessity of purchasing checks by the million.

The following, from S. E. Mayo, Esq., General Ticket Agent of the Albany & Susquehanna Railway—a gentleman who has given the checking of baggage a most careful, practical consideration—is but one from nearly forty representatives of the best and greatest roads in the country in reference to its incomparable value both as a local and through check:

"In reference to the Thomas Safety Railroad Baggage-Check, it has no equal; and, if I were not thoroughly convinced by personal experience, that it merits all and more than is claimed for it, I would not speak so highly in its favor. As you are aware, we have recently added a large number of new through tickets to our stock—with the Erie Railway, alone, some 38 different forms. With the old style of checking baggage, I should have been compelled to buy not less than 3,800 checks for those 38 stations, which is obviated by the Thomas system of checking baggage. Instead of covering the whole side of my baggage-room with 3,800 different forms of baggage-checks, I simply add 38 forms of station-cards to my collection, in a thirty-inch case, alongside of which are my brass checks for any station designated by card. Another great advantage possessed by this check over the old style, is, if we should discontinue our connection with any route, the Thomas Check is not lost or become useless, as is the case with the old style of checking baggage, but with the cards, they at once become available elsewhere. Experience daily convinces me that the Thomas Check is the only economical, systematic and safe check in use, and that it will not be possible much longer for its opposers to close their eyes upon its many great advantages over all other checks and systems of checking baggage, and it must ultimately commend itself to any and all who are not too prejudiced to give it a fair trial. I therefore recommend it with perfect confidence to all railroad companies as the best baggage-check in use, for both local and through travel."

HENRY STEFFER, Esq., G. T. A. of the Louisville, Cincinnati & Lexington Railroad, says:

G. F. THOMAS, Esq., 90, 92 and 94 Grand Street, New York:
DEAR SIR: It is with much pleasure that I am able to inform you that our baggage-men consider the Thomas Improved Safety Baggage-Check unequalled. They inform me that it facilitates the checking of baggage wonderfully, in consequence of being able to send, with any check, a piece of baggage from any station to any station, and not being compelled to spend several minutes in looking for a particular check for a certain station; by the use of your check, they save from one-half to two-thirds of the time required to check baggage by the old style of check, and with much more certainty. To stock our road as perfectly with the old style of check as we have with yours, would require, at the least calculation, full twenty times the number of checks, which, in place of simplifying, complicates the checking of baggage; your check obviates all this complexity, and so simplifies the business that it is impossible to make a mistake, unless through gross negligence or incompetency. Previous to the introduction of the Thomas Check, in consequence of the great expense, no road would even think of bringing the checking of baggage to such a state of perfection as yours does, it requiring such large quantities of brass checks to do the business as it ought to be done, which is the reason such a great number of railroads, even to this day, adhere to the old English style of pasting and chalking baggage. I am satisfied that, if the officers of all the railroads were as well acquainted with the superiority of your check in every respect as are the officers of those roads upon which it is in use, it would be universally adopted, both as a local and through check, not only on account of its accuracy, economy and certainty, but also in consequence of its unequalled advantages in facilitating and simplifying the whole baggage business.

S. SCHUCH, Esq., Superintendent of the Morris & Essex Railroad, says:

"We have used the Thomas Safety Baggage Check on our road over two years, during which time we have had no piece of baggage to which it was attached, but, on the contrary, the baggage in every instance arrives at its place of destination with unerring certainty. We do, therefore, without the least hesitancy, recommend its use to any railroad company, being fully satisfied, after the most thorough trial, that, for a safe, reliable railroad baggage check, it has no equal, and, were it at this time in use upon every road in the country, the checking of baggage would not only be reduced to a perfect system, but would also be the means of saving railroad companies fully one-half of the present cost of conducting the baggage business."

JAMES M. WHITE, Esq., Train Master of the Central Railroad of Georgia, says:

"We are much pleased with the Thomas Patent Safety Baggage Check. They are just the check required by railroad companies, as they can be prepared in advance, or changed in a moment, for any station, and a very small number of brass checks does the work of many. There is not the least doubt that it will in time take the place of all other baggage checks now in use."

A. C. DAVIS, Esq., G. T. A. of the Belvidere, Delaware & Flemington Railroad, says:

"The Thomas Safety Baggage Check works to our entire satisfaction. No failure in the transmission of baggage since we began its use. The baggage masters are pleased with them, and I am well satisfied they are the best baggage check in use, and better calculated to perform the various duties of both local and through business than any or all other baggage checks I have ever seen. Every check is, and has been, kept in constant use since we first commenced using them; and, so far as certainty, simplicity and economy are concerned, they have no equal."

All necessary information in reference to the Thomas Patent Safety Railroad, Steamboat and Express Baggage Check will be given by addressing

G. F. THOMAS Editor Appleton's R'y Guide.

90, 92, 94 Grand St., New York

THE "RED LINE!"

—RUNNING OVER THE—

Michigan Southern and Lake Shore R. R.'s,

—WAS THE—

FIRST LINE to CARRY FREIGHT BETWEEN the EAST and WEST,
WITHOUT CHANGE OF CARS!

CARS RUN THROUGH TO
NEW YORK AND BOSTON,
IN FOUR AND FIVE DAYS!

Contracts made at the Offices of the Line.

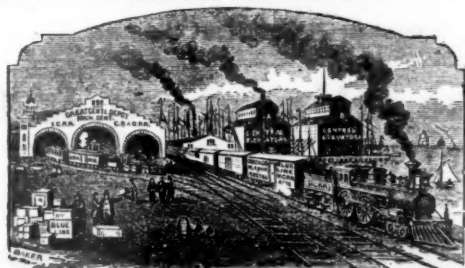
C. Shutter, Agent, 347 Broadway, New York. A. Cushman, Agent, Old State House, Boston, Mass.
W. D. MANCHESTER, Agent, 54 Clark St., Chicago.

Great Central Route.

"BLUE LINE."

ORGANIZED JANUARY 1, 1867.

1870.



1870.

OWNED AND OPERATED BY THE

Michigan Central, Illinois Central, Chicago, Burlington & Quincy, Chicago & Alton, Great Western (of Canada), New York Central, Hudson River, Boston & Albany, and Providence and Worcester Railroads.

The "BLUE LINE" is the only route that offers to shippers of freight the advantages of an unbroken gauge through from Chicago to the Seaboard, and to all Interior Points on the line of Eastern Connections beyond Suspension Bridge and Buffalo. All Through Freight is then transported between the most distant points of the roads in interest.

WITHOUT CHANGE OF CARS!

The immense freight equipment of all the roads in interest is employed, as occasion requires, for the through service of this Line, and has of late been largely increased. This Line is now prepared to extend facilities for the transit and delivery of all kinds of freight in Quicker Time and in Better Order than ever before.

The Blue Line Cars

are all of a solid, uniform build, thus largely lessening the chances of delay from the use of cars of a mixed construction, and the consequent difficulty of repairs, while remote from their own roads. The Blue Line is operated by the railroad companies who own it, without the intervention of intermediate parties between the Roads or Line and the public.

Trains run through with regularity IN FOUR OR FIVE DAYS to and from New York and Boston. Special care given to the Safe and Quick Transport of Property Liable to Breakage or Injury, and to all Perishable Freight.

Claims for overcharges, loss or damage, promptly settled upon their merits. Be particular and direct all shipments to be marked and consigned via

"BLUE LINE."

FREIGHT CONTRACTS given at the offices of the company in Chicago, New York and Boston.

J. D. HAYES, GEN. MANAGER, ... Detroit. P. K. RANDALL, ... No. 11 State St., Boston
C. E. NOBLE, ... No. 8 Astor House, N. Y. F. A. HOWE, ... 31 Dearborn St., Chicago
N. D. MUNSON, ... Quincy, Ill. W. W. STREET, ... 31 Dearborn St., Chicago
GEO. E. JARVIS, ... 273 Broadway, N. Y. J. JOHNSON, ... Cairo, Ill

THOS. HOOPS, GEN. FR'T AGT. Michigan Central Railroad, Chicago.
A. WALLINGFORD, AGT. GEN. WEST'N R. R., No. 91 Lake St., Chicago.
N. A. SKINNER, Freight Agent Michigan Central Railroad.

Empire Line!

THE EMPIRE TRANSPORTATION COMPANY'S

Fast Freight Line to the East

—AND—

TO THE COAL AND OIL REGIONS,
Via Michigan Southern, Lake Shore, and Philadelphia & Erie R. R.'s,
WITHOUT TRANSFER!

Office, No. 72 LaSalle Street, Chicago.

GEO. W. RISTINE, Western Superintendent, Cleveland, Ohio.
W. G. Van Demark, ... 265 Broadway, New York. E. L. O'Donnell, ... Baltimore, Md
G. B. McCulloch, ... 42 South 5th St., Philadelphia. Wm. F. Smith, ... Erie, Penn
JOHN WHITTAKER, Pier 14 North River, New York.

JOSEPH STOCKTON, Agent, Chicago.

W. T. HANCOCK, Contracting Agent.
WM. F. GRIFFITHS, Jr., Gen. Freight Agent, Philadelphia.

General Freight Department.

The Illinois Central Railroad

ARE PREPARED TO TAKE FREIGHT FOR

Cairo, St. Louis, Peoria,
BLOOMINGTON, SPRINGFIELD, JACKSONVILLE,

And All Points in the Central and Southern parts of the State;

MOBILE & NEW ORLEANS BY RAIL OR RIVER

And ALL POINTS on the MISSISSIPPI below CAIRO. Also, to

Freeport, Galena and Dubuque.

Freight Forwarded with Promptness and Despatch, and Rates at all times as LOW as by any other Route.

BY THE COMPLETION OF THE BRIDGE AT DUNLEITH,

THEY ARE ENABLED TO TAKE FREIGHT TO ALL POINTS WEST OF DUBUQUE WITHOUT CHANGE OF CARS!

DELIVER FREIGHT IN CHICAGO ONLY at the FREIGHT DEPOT of the Company, foot of South Water St. Parties ordering Goods from the East should have the packages marked:

"Via Illinois Central Railroad."

For THROUGH BILLS OF LADING, and further information, apply to the LOCAL FREIGHT AGENT at Chicago, or to the undersigned.

M. HUGHITT, Gen. Supt. J. F. TUCKER, Gen. Freight Agt.
J. H. LINVILLE, PRESIDENT. J. L. PIPER, GEN. MANAGER. A. G. SHIFFLIN, SUP'T & TREAS.

The Keystone Bridge Company

OF PITTSBURGH, PENN.

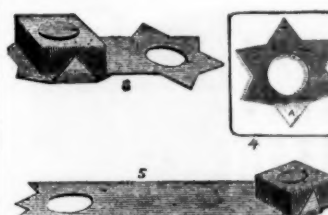
Office and Works, 9th Ward, Pittsburgh, Pa. Philadelphia Office, 426 Walnut Street

GENERAL WESTERN OFFICE:—13 Fullerton Block, 94 Dearborn St., CHICAGO, ILL.

This Company possess unrivaled facilities for manufacturing and erecting every description of Iron and Wooden Railway and Road Bridges, Roofs, Turn-Tables and Buildings, "Linville and Piper" Patent Iron Bridges, Self-Sustaining Pivot Bridges, Suspension Bridges, and Ornamental Park Bridges. Contractors for Wooden or Iron Bridges of any pattern, as per plans and specifications. Circulars sent on application.

WALTER KATTE, ENGINEER. A. D. CHERRY, SECRETARY.

THE UNION PATENT STOP WASHER,



Manufactured at Coatesville, Chester Co., Pa., on the line of the Pennsylvania Central R. R., has now stood the test of practical use on the above road, the Philadelphia, Wilmington & Baltimore and Philadelphia & Reading Railroads, for the past two years, and proved itself to be what is claimed for it—a perfect security against the unscrewing or receding of nuts. Its simplicity, efficiency and cheapness over any other appliance for the purpose should recommend it to the attention of all persons having charge of Railroad tracks, cars and machinery.

It is especially adapted to, and extensively used by leading Railroads of the country for the purpose of securing nuts on railway joints. The accompanying cuts show the application of the Washer. For further information, apply to

A. GIBBONS, Coatesville, Pa.

MANSFIELD ELASTIC FROG COMPANY



OF CHICAGO.

AMOS T. HALL, President. J. H. DOW, Superintendent.

Are now prepared to receive and promptly execute orders for RAILROAD FROGS and CROSSINGS, warranted to prove satisfactory to purchasers.

For DURABILITY, SAFETY and ELASTICITY—being a combination of Steel, Boiler Plate and Wood—they are UNEQUALLED, as Certificates of Prominent Railroad Officials will testify.

The SAVING TO ROLLING STOCK AND MOTIVE POWER is at least equal to double the cost of the FROG. Orders should be addressed to

CRERAR, ADAMS & CO., Gen'l Agents,
No. 18 Wells Street, CHICAGO.

LEBANON MANUFACTURING COMPANY,

LEBANON, PENNSYLVANIA,

IS PREPARED TO BUILD AT SHORT NOTICE,

HOUSE, GONDOLA, COAL, ORE,

And all other Kinds of

CARS!

Also, IRON and Every Description of CAR CASTINGS Made to Order.

DR. C. D. GLONINGER, President. J. M. GETTEL, Superintendent

CHICAGO, ROCK ISLAND & PACIFIC RAILROAD.

THE DIRECT ROUTE FOR
Joliet, Morris, Ottawa, La Salle, Peru, Henry,
Lacon, Peoria, Geneseo, Moline, Rock Island,
DAVENPORT, MUSCATINE, WASHINGTON, IOWA CITY,
Grinnell, Newton, Des Moines,

COUNCIL BLUFFS & OMAHA

CONNECTING WITH TRAINS ON THE UNION PACIFIC RAILROAD, FOR

CHEYENNE, DENVER, CENTRAL CITY, OGDEN, SALT LAKE,
WHITE PINE, HELENA, SACRAMENTO, SAN FRANCISCO,

And Points in Upper and Lower California; and with Ocean Steamers at San Francisco, for all Points in
China, Japan, Sandwich Islands, Oregon and Alaska.

TRAINS LEAVE their Splendid new Depot, on VanBuren Street, Chicago, as follows:

	LEAVE.	ARRIVE.
PACIFIC EXPRESS, (Sunday excepted).....	10.00 a.m.	3.25 p.m.
PERU ACCOMMODATION, (Sundays excepted).....	4.30 p.m.	9.50 a.m.
PACIFIC EXPRESS, (Saturdays excepted,).....	11.00 p.m.	(Mon. ex. 7.00 a.m.)

Elegant Palace Sleeping Cars run Through to Peoria & Council Bluffs
WITHOUT CHANGE!

TICKETS TO ST. LOUIS!

FIRST CLASS, including Meals and Berths on Steamer bet. Peoria and St. Louis, - \$8.00
SECOND CLASS, - \$5.50

AN ELEGANT PASSENGER STEAMER

Leaves Peoria every morning for St. Louis, upon arrival of Night Express, leaving Chicago daily (Saturday excepted) at 11 00 P. M., from Great Rock Island Depot, head of LaSalle St., arriving in St. Louis the following morning, connecting with morning trains leaving the city, and with steamers down the River.

Families Emigrating to Missouri or Kansas, will find this the most desirable and cheapest Route, as through Freight Rates for household goods are much lower than all rail routes.

Connections at LA SALLE, with Illinois Central Railroad, North and South; at PEORIA, with Peoria, Pekin & Jacksonville Railroad, for Pekin, Virginia, &c.; at PORT BYRON JUNCTION, for Hampton, LaCaire, and Port Byron; at ROCK ISLAND, with Packets North and South on the Mississippi River.

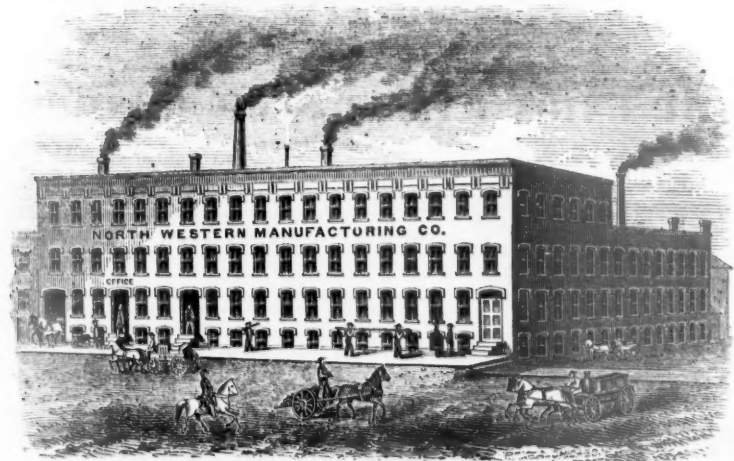
For Through Tickets, and all desired information in regard to Rates, Routes, etc., call at the Company's Office, No. 37 South Clark Street, Chicago.

A. M. SMITH, Gen. Pass. Agent. HUGH RIDDLE, Gen. Supt. P. A. HALL, Asst. Gen. Supt.

R. T. CRANE, President. C. S. CRANE, Vice-President. S. W. ADAMS, Secretary.

THE NORTHWESTERN MANUFACTURING COMPANY,

SUCCESSORS TO R. T. CRANE & BRO.



MANUFACTURERS OF FIRST-CLASS

Steam Engines

[HORIZONTAL AND UPRIGHT,]

With Tremain's Patent Balance Valve,

Brass and Iron Goods for Steam and Gas Fitters and Engine Builders, Malleable Iron Castings, &c.

STEAM PUMPS, AND GENERAL MACHINERY, WROUGHT IRON PIPE,

CONSTRUCTORS OF R. T. CRANE'S

PATENT STEAM WARMING & VENTILATING APPARATUS,

Perfected, Simplified and adapted to Dwellings, School-houses, Churches, &c., &c.

Jefferson St., between Lake and Randolph, Chicago
OFFICE: 100 WASHINGTON ST.

PITTSBURGH CAST STEEL SPRING WORKS.

A. French & Co.,

Manufacturers of Extra Tempered, Light Elliptic

CAST STEEL SPRINGS, FOR RAILROAD CARS AND LOCOMOTIVES,

FROM BEST CAST STEEL.

OFFICE AND WORKS:—Cor. Liberty and 21st Sts., PITTSBURGH, PA.

CHICAGO BRANCH, 88 Michigan Ave.

HUSSEY, WELLS & CO.,

MANUFACTURERS OF ALL DESCRIPTIONS OF

CAST STEEL!

BEST REFINED STEEL FOR EDGE TOOLS.

Particular attention paid to the Manufacture of

Steel for Railroad Supplies.

HOMOGENEOUS PLATES,

For Locomotive Rollers and Fire Boxes.

Smoke Stack Steel, Cast Steel Forgings,

FOR CRANK PINS, CAR AXLES, &c.

Also Manufacturers of the Celebrated Brand,

"Hussey, Wells & Co. Cast Spring Steel,"

For Elliptic Springs for Railway Cars and Locomotives.

Office and Works, Pittsburgh, Pa.

BRANCH WAREHOUSES:

88 MICHIGAN AVENUE, CHICAGO.

139 & 141 Federal St. Boston. | 30 Gold St., - - - New York

Vose, Dinsmore & Co., NATIONAL SPRING WORKS,

MANUFACTURERS OF



Volute Buffer Spring.



Group Rubber Center Spiral Spring

VOLUTE BUFFER, INDIA RUBBER, RUBBER CENTRE SPIRAL, COMPOUND SPIRAL, AND OTHER

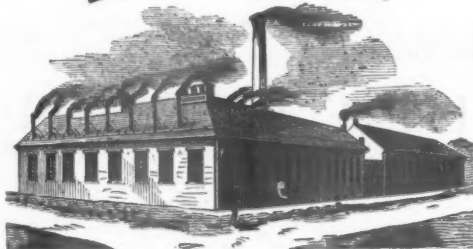
RAILWAY CAR SPRINGS.

No. 1 Barclay St., NEW YORK. | No. 15 La Salle St., CHICAGO.

WORKS ON 129th AND 130th STREETS, NEW YORK.

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LANCASTER FILE CO.



MANUFACTURERS OF

Superior Cast Steel Files.

LANCASTER, PA.

The National Iron Co.

[Successor to Wm. Hancock, Rough and Ready Iron Works,]

ESTABLISHED 1847.

DANVILLE, PENNSYLVANIA.

MANUFACTURER OF

RAILROAD IRON,

RAILROAD CHAIRS, SPLICE BARS AND BOLTS, FROGS, SWITCH RODS, STANDS AND LEVERS, HOOKHEAD AND COUNTERSUNK HEAD SPIKES, BRIDGE AND CAR BOLTS, ROLLS AND ROLLING MILL MACHINERY, BLAST FURNACE CASTINGS AND MACHINERY, STEAM ENGINES AND BOILERS, IRON AND BRASS CASTINGS, ENGINE AND MACHINE WORK, STEAM & WATER FITTINGS, &c., &c.

WM. HANCOCK, President.

BENJ. J. WELCH, Sec., Treas. and P. C. BRINCK, Vice-President, 40 G'n. Manager, Danville, Pa. Walnut St., Philadelphia.

CHICAGO & NORTHWESTERN R. W.

Comprising the PRINCIPAL RAILROADS from CHICAGO Directly NORTH NORTH-WEST and WEST.

ALL RAIL TO THE PACIFIC OCEAN!

Great California Line.

TRAINS LEAVE WELLS STREET DEPOT AS FOLLOWS:

8:15 A. M. Cedar Rapids Pass. 11:00 P. M. Night Mail.
10:45 A. M. Pacific Express. 11:00 P. M. R. Island Pass.
10:45 A. M. Rock Island Exp. 4:00 P. M. Dixon Passenger.

For Fulton, Clinton, Cedar Rapids, Boone, Denison, Missouri Valley Junction, Sioux City, Council Bluffs and Omaha, there connecting with the

UNION PACIFIC R. R.

For Cheyenne, Denver, Ogden, Salt Lake, the White Pine Silver Mines, Sacramento, San Francisco, an all parts of Nebraska, Colorado, New Mexico, Arizona, Wyoming, Montana, Idaho, Utah, Nevada, and the PACIFIC COAST.

FROM CHICAGO	Hours.	1st Class Fare.	FROM CHICAGO	Days.	1st Class Fare.
To OMAHA.....	23	\$20.00	To SACRAMENTO.....	4 1/2	\$118.00
" DENVER.....	52	70.75	" SAN FRANCISCO.....	5	118.00

TRAINS ARRIVE:—Night Mail, 7:00 a. m.; Dixon Passenger, 11:00 a. m.; Pacific Express, 3:25 p. m.; Rock Island Express, 3:25 p. m.; Cedar Rapids Passenger, 6:50 p. m.

FREEPORT LINE.

9.00 A. M. & 9.45 P. M. For Belvidere, Rockford, Freeport, Galena, Du-
leith, and St. Paul.

4.00 P. M., Rockford Accommodation.
5.30 P. M., Geneva and Elgin Accommodation
6.10 P. M., Lombard Accommodation.

TRAINS ARRIVE:—Freeport Passenger, 2:30 a. m.; 3:00 p. m.; Rockford Accommodation, 11:05 a. m.; Geneva and Elgin Accommodation, 8:45 a. m.; Lombard Accommodation, 6:50 a. m.

WISCONSIN DIVISION.

Trains leave Depot, cor. West Water and Kinzie Sts., daily, Sundays excepted, as follows:
10.00 A. M. DAY EXPRESS, for Janesville, Monroe, Whitewater, Madison, Prairie du
Paul, and ALL POINTS ON THE UPPER MISSISSIPPI RIVER; Ripon, Berlin, Fond du Lac, Oshkosh,
Neenah, Appleton, and Green Bay.

3.00 P. M., Janesville Accommodation.
5.00 P. M. NIGHT EXPRESS, for Madison, Prairie du Chien, Watertown, Minnesota
Junction, Portage City, Sparta, La Crosse, St. Paul, and ALL POINTS ON THE
UPPER MISSISSIPPI RIVER; Ripon, Berlin, Fond du Lac, Oshkosh, Neenah, Appleton, Green Bay,
and THE LAKE SUPERIOR COUNTRY.

5.30 P. M., Woodstock Accommodation.
TRAINS ARRIVE:—5:30 a. m., 9:00 a. m., 2:00 p. m. and 7:15 p. m.

MILWAUKEE DIVISION.

9.45 A. M. & 5.00 P. M. EXPRESS, (except Sunday,) for Waukegan, Ken-
osha, Racine and Milwaukee.
MILWAUKEE ACCOMMODATION, with Sleeping Car attached.....11:00 P. M.
EVANSTON ACCOMMODATION, (Daily,) from Wisconsin Div. Depot.....1:30 P. M.
KENOSHA ACCOMMODATION, (Sundays excepted) from Wells St. Depot.....4:15 P. M.
AFTERNOON PASSENGER, from Milwaukee Div. Depot.....5:00 P. M.
WAUKEGAN ACCOMMODATION, (except Sundays) from Wells St. Depot.....5:25 P. M.
WAUKEGAN PASSENGER, (Sundays excepted) from Wells St. Depot.....6:10 P. M.
TRAINS ARRIVE:—Night Accommodation, with Sleeping Car, 5:45 a. m.; Day Express,
10:45 a. m. and 7:20 p. m.; Waukegan Accommodation, 8:40 a. m.; Kenosha Accommodation, 9:10
a. m.; Evanston Accommodation, 4:00 p. m.; Waukegan Passenger, 8:10 a. m.

PULLMAN PALACE CARS ON ALL-NIGHT TRAINS.

THROUGH TICKETS Can be purchased at all principal Railroad Offices
East and South, and in Chicago at the Southeast
corner of Lake and Clark Streets, and at the Passenger Stations as above.

H. P. STANWOOD, JNO. P. HORTON, GEO. L. DUNLAP,
Gen. Ticket Agt. N. W. Pass. Agt. Gen'l Supt.

Western Union Railroad.

CHICAGO & NORTHWESTERN DEPOT, MILWAUKEE & CHICAGO DEPOT,
CHICAGO, MILWAUKEE.

THE DIRECT ROUTE!

CHICAGO, RACINE & MILWAUKEE,
—TO—

Beloit, Savanna, Clinton, Ft. Byron, Davenport, Mineral Point,
Madison, Freeport, Fulton, Lyons, Rock Island, Sabula,
Galena, Dubuque, Des Moines, Council Bluffs,

OMAHA, SAN FRANCISCO

AND ALL PRINCIPAL POINTS IN

Southern and Central Wisconsin, Northern Illinois, and Central and Northern Iowa.

FRED. WILD, D. A. OLIN,
G. a. Ticket Agent. Gen. Superintendent

CRERAR, ADAMS & CO.

MANUFACTURERS AND DEALERS IN

Railroad Supplies!

—AND—

CONTRACTORS' MATERIAL.

11 and 13 Wells Street,

CHICAGO, ILL.

Manufacturers of IMPROVED HEAD-LIGHTS for Locomotives,
Land and Signal Lamps, Car and Station Lamps, Brass Dome
Lamps, Dome Mouldings, Cylinder Heads, and Car Trimmings, of
Every Description



Pan-Handle

—AND—

Penn'a Central Route East!

SHORTEST AND QUICKEST ROUTE, VIA COLUMBUS, TO

PITTSBURGH, BALTIMORE, PHILADELPHIA & NEW YORK

On and after Saturday, JANUARY 1st, 1870, Trains for the East will run as follows:

[DEPOT CORNER CANAL AND KINZIE STS., WEST SIDE.]

6:45 A. M. NEW YORK EXPRESS.
[SUNDAYS EXCEPTED.] Arriving at

COLUMBUS... 8:55 P. M. HARRISBURG... 2:30 P. M. NEW YORK... 10:30 P. M. WASHINGTON... 1:00 P. M.
PITTSBURGH... 7:05 P. M. PHILADELPHIA... 9:40 A. M. BALTIMORE... 9:00 A. M. BOSTON... 11:50 P. M.

7:45 P. M. NIGHT EXPRESS.
[SATURDAYS EXCEPTED.] Arriving at:

COLUMBUS... 11:00 A. M. HARRISBURG... 5:30 A. M. NEW YORK... 12:05 P. M. WASHINGTON... 1:00 P. M.
PITTSBURGH... 7:05 P. M. PHILADELPHIA... 9:40 A. M. BALTIMORE... 9:00 A. M. BOSTON... 11:50 P. M.

Woodruff's Palace Day and Sleeping Cars

Run Through to COLUMBUS, and from Columbus to NEW YORK, WITHOUT CHANGE!

ONLY ONE CHANGE TO NEW YORK, PHILADELPHIA, OR BALTIMORE!
TRY THE NEW ROUTE. FARE AS LOW AS BY OTHER LINES.

CINCINNATI & LOUISVILLE AIR LINE SOUTH

Miles the Shortest Route to Cincinnati,

18 Miles the Shortest Route to Indianapolis and Louisville

—FROM ONE TO—

2 Hours the Quickest Route to Cincinnati

THE SHORTEST AND BEST ROUTE TO

Columbus, Chillicothe, Hamilton, Wheeling, Parkersburg, Evansville,
Dayton, Zanesville, Marietta, Lexington, Terre Haute, Nashville,

ALL POINTS IN CENTRAL & SOUTHERN OHIO, & INDIANA, KENTUCKY & VIRGINIA.

—QUICK, DIRECT AND ONLY ALL RAIL ROUTE TO—

New Orleans, Memphis, Mobile, Vicksburg, Charleston, Savannah,
AND ALL POINTS SOUTH.

Cincinnati, Indianapolis and Louisville Trains run as follows:

THROUGH WITHOUT CHANGE OF CARS!

6:45 A. M. 7:45 P. M.

(Sundays excepted) Arriving at

(Saturdays excepted.) Arriving at

LOGANSPORT.....	12:10 P. M.	LOGANSPORT.....	1:30 A. M.
KOKOMO.....	1:40 P. M.	KOKOMO.....	2:40 A. M.
CINCINNATI.....	9:40 P. M.	CINCINNATI.....	10:00 A. M.
INDIANAPOLIS.....	4:30 P. M.	INDIANAPOLIS.....	6:00 A. M.
LOUISVILLE.....	11:30 A. M.	LOUISVILLE.....	3:20 P. M.

Lansing Accommodation: Leaves 3:45 P. M. Arrives 9:15 A. M.

PULLMAN'S PALACE SLEEPING CARS!

Accompany all Night Trains between Chicago and Cincinnati or Indianapolis.

Ask for tickets via COLUMBUS for the East, via HAGERSTOWN for Cincinnati,
and via KOKOMO for Indianapolis, Louisville and points South. Tickets for sale and
Sleeping Car Berths secured at 95 RANDOLPH STREET, CHICAGO, and at Principal
Ticket Offices in the West and Northwest.

S. F. SCULL,
Gen. Ticket Agent, Columbus.

I. S. HODSDON,
Northwestern Pass. Agt., Chicago.

KANSAS PACIFIC RAILWAY.

Great Smoky Hill Route!

—TO—

COLORADO, NEW MEXICO, ARIZONA, UTAH,

Montana, Nevada, California and Northern States of Old Mexico.

COMPLETED THROUGH KANSAS, TO

Carson, Colorado, 487 Miles West of Kansas City and Leavenworth.

Close Connections are made with Express Trains of the HANBIBAL & ST. JOSEPH and NORTH MISSOURI
RAILROADS, at KANSAS CITY, and with MISSOURI PACIFIC RAILROAD at STATE LINE.

DAILY EXPRESS TRAINS are run between

KANSAS CITY, LEAVENWORTH, LAWRENCE,
Topeka, Wamego, Manhattan, Junction City, Salina, Brookville,
HAWKER, HAYS and CARSON.

Pullman's Sleeping Cars Attached to Night Express Trains!

Passenger Time from Kansas City to Denver, Less than 50 Hours.

Hughes & Co.'s Four-Horse Concord Coaches leave Carson daily for Denver, Central City, George
town, &c.

Southern Overland Passenger Express and Mail Coaches leave Carson daily for Fort Lyon, Pueblo,
Trinidad, Fort Union, Las Vegas, Santa Fe, &c.

Ask for Through Tickets via Kansas Pacific Railway, "Smoky
Hill Route." Freight and Passage Rates as Low and Time as Quick as by any other Route.

R. B. GEMMELL, Gen. Ticket Agent.

A. ANDERSON, Gen. Supt.

THE FAVORITE THROUGH PASSENGER ROUTE!

Chicago, Burlington & Quincy

RAILROAD, AND CONNECTIONS.

3 THROUGH EXPRESS TRAINS DAILY.

FROM CHICAGO	Hours.	1st Class Fare.	FROM CHICAGO	Days.	1st Class Fare.
To OMAHA, -	23	\$20.00	To DENVER, -	2½	\$70.75
" ST. JOSEPH, -	21	19.50	" SACRAMENTO, -	4½	118.00
" KANSAS CITY, -	22	20.00	" SAN FRANCISCO, -	5	118.00

TRAINS LEAVE CHICAGO from the Great Central Depot, foot of Lake Street, as follows:

BURLINGTON, KEOKUK, COUNCIL BLUFFS AND OMAHA.

7:30 A. M. MAIL AND EXPRESS. (Daily except Sunday,) stopping at all stations between Chicago and Burlington; making close connections at Mendota with Illinois Central for Amboy, Dixon, Freeport, Galena, Dunleith, Dubuque, LaSalle, El Paso, Bloomington, &c., &c.

10:00 A. M. PACIFIC EXPRESS. (Daily except Sunday,) stopping only at Riverside, Hinsdale, Aurora, Leland, Mendota, Princeton, Rock Island Crossing, Buda, Kewanee, Galva, Galesburg, and Monmouth, between Chicago and Burlington. **PULLMAN PALACE DRAWING ROOM CAR** attached to this train daily from Chicago.

TO COUNCIL BLUFFS AND OMAHA, WITHOUT CHANGE!

11:30 P. M. NIGHT EXPRESS. (Daily, except Saturday,) stopping at all principal stations between Chicago and Burlington. **ELEGANT DAY COACHES**, and a **PULLMAN PALACE SLEEPING CAR** are attached to this train from Chicago to Burlington, without change! This is the only Route between

CHICAGO, COUNCIL BLUFFS & OMAHA,

— RUNNING THE CELEBRATED —

Pullman Palace Dining Cars!

The Shortest, Best, Quickest and only Route between

CHICAGO & KEOKUK,

Without Ferrying the Mississippi River!

QUINCY, ST. JOSEPH, LEAVENWORTH AND KANSAS CITY.

10:00 A. M. PACIFIC EXPRESS. (Daily, except Sunday,) with Pullman Palace Coach attached, running through from Chicago to KANSAS CITY, Without Change!

8:30 P. M. EVENING EXPRESS. (Daily, except Sunday,) with Pullman Palace Drawing Room Sleeping Car attached, running through from Chicago to QUINCY, Without Change!

11:30 P. M. NIGHT EXPRESS. (Daily, except Saturday,) with Pullman Palace Drawing Room Sleeping Car attached from Chicago to GALESBURG; PALACE DAY COACHES from Chicago to QUINCY, Without Change!

This is the Shortest, Quickest and only Route between

CHICAGO AND KANSAS CITY,

WITHOUT CHANGE OF CARS OR FERRY.

THE SHORTEST, BEST AND QUICKEST ROUTE BETWEEN CHICAGO AND

St. Joseph, Atchison, Weston, Leavenworth,

AND ALL POINTS ON THE KANSAS PACIFIC R.R.

Local Trains Leave: **RIVERSIDE & HINSDALE ACCOM.** 1:30 & 6:00 P. M.
MENDOTA PASSENGER. 3:30 P. M.
AURORA PASSENGER. 5:30 P. M.

Trains Arrive:—Mail and Express, 3:40 p. m.; Atlantic Exp., 4:00 p. m., except Sunday; Night Exp., 6:00 a. m., except Monday; Mendota Passenger, 9:50 a. m.; Aurora Passenger, 8:35 a. m.; Riverside and Hinsdale Accommodation, 7:30 a. m. and 5:30 p. m., except Sunday.

Ask for Tickets via Chicago, Burlington & Quincy Railroad, which can be obtained at all principal offices of connecting roads, and at Company's office in Great Central Depot, Chicago, at as low rates as by any other route.

ROB'T HARRIS, Gen'l Superintendent, CHICAGO.
SAM'L POWELL, Gen'l Ticket Agent, CHICAGO.
E. A. PARKER, Gen. West. Pass. Agt., CHICAGO.

PASSENGERS GOING WEST!

To Missouri, Kansas, Nebraska, Colorado or New Mexico, Should Buy Tickets via the Short Route

HANNIBAL & ST. JOSEPH R. R. LINE.

Three Express Trains from Quincy or Macon to St. Joseph.

— ALSO DIRECT —

To Kansas City

WITHOUT CHANGE OF CARS!

CONNECTIONS ARE CLOSE AND DIRECT FOR

ATCHISON, WESTON & LEAVENWORTH.

CONNECTIONS:

AT KANSAS CITY, with Kansas Pacific Railway, for Lawrence, Ottawa, Topeka, Fort Riley Junction City, Fort Hays, Sheridan, &c.

AT KANSAS CITY, with Kansas City, Fort Scott, and Galveston Railroad, for Fort Scott, Fort Gibson, Galveston, &c.

AT ST. JOSEPH, with St. Joseph & Council Bluffs Railroad, ALL RAIL from St. Joseph to

Nebraska City, Council Bluffs & Omaha.

AT OMAHA, with Nebraska Union Pacific Railroad, for Fort Kearney, Julesburg, Cheyenne, Lamar, Benton, &c.

AT COUNCIL BLUFFS, for Sioux City, all Rail.

By this Line, passengers have choice of Overland Routes, either via Smoky Hill or Platte Route To Denver, Central City, Salt Lake, Sacramento, California and all points in the Mining Regions.

Daily Overland Coaches via Smoky Hill Route leave Sheridan, end of U. P. R. R., for Santa Fe and New Mexico

Through Tickets for Sale at all Ticket Offices.

P. B. GROAT, Gen. Ticket Agent. **GEO. H. NETTLETON,** Gen. Supt.
HENRY STARRING, Gen. Agent, Chicago.

Old, Reliable, Air-Line Route!

CHICAGO, ALTON & ST. LOUIS R. R.

SHORTEST, QUICKEST AND ONLY DIRECT ROAD TO

Bloomington, Springfield, Jacksonville, Alton,

— AND —

ST. LOUIS!

WITHOUT CHANGE OF CARS.

THE ONLY ROAD MAKING IMMEDIATE CONNECTIONS AT ST. LOUIS, WITH MORNING AND EVENING TRAINS

— FOR —

ATCHISON, LEAVENWORTH, KANSAS CITY,

Lawrence, Topeka, Memphis, New Orleans,

And All Points South and Southwest.

TRAINS leave Chicago from the West-side Union Depot, near Madison Street Bridge.

EXPRESS MAIL, [Except Sundays].....	10:00 A. M.
LIGHTNING EXPRESS, [Except Saturdays and Sundays].....	11:00 P. M.
NIGHT EXPRESS, [Except Saturdays].....	7:00 P. M.
JOLIET ACCOMMODATION, [Except Sundays].....	4:00 P. M.
JACKSONVILLE EXPRESS, [Daily].....	7:00 P. M.

Trains arrive at Chicago at 8:00 P. M., 7:00 A. M. and 12:05 P. M. Joliet Accom., 9:45 A. M.

This is the ONLY LINE Between CHICAGO & ST. LOUIS RUNNING

Pullman's Palace Sleeping and Celebrated Dining Cars!

BAGGAGE CHECKED THROUGH.

Through Tickets can be had at the Company's office, No. 55 Dearborn street, Chicago, or at the Depot, corner of West Madison and Canal streets, and at all principal Ticket Offices in the United States and Canada. Rates of Fare and Freight as low as by any other Route.

A. NEWMAN, Gen. Pass. Agent.**J. C. McMULLIN,** Gen. Supt.

North Missouri R. R.

PASSENGERS FOR

KANSAS AND THE WEST,

ARE REMINDED THAT

THE NORTH MISSOURI R. R.

— IS —

11 MILES SHORTER than any other Route!

BETWEEN

St. Louis and Kansas City.

15 Miles Shorter between ST. LOUIS and LEAVENWORTH

— AND —

49 MILES SHORTER TO ST. JOSEPH!

THAN ANY OTHER LINE OUT OF ST. LOUIS.

Three Through Express Trains Daily!

Pullman's Celebrated Palace Sleeping Cars on all Night Trains!

FOR TICKETS, apply at all Railroad Ticket Offices, and see that you get your Tickets via St. Louis and North Missouri Railroad.

C. N. PRATT,
 Gen. East'n Agt., 111 Dearborn st.
 CHICAGO.

J. M. DAVIES,
 General Passenger Agent,
 ST. LOUIS.

S. H. KNIGHT,
 General Superintendent,
 ST. LOUIS.

Pacific Railroad of Missouri.

THE MOST DIRECT AND RELIABLE ROUTE FROM ST. LOUIS THROUGH TO

KANSAS CITY, LEAVENWORTH & ATCHISON,

WITHOUT CHANGE OF CARS!

Close Connections at KANSAS CITY with Missouri Valley, Missouri River, Ft. Scott & Gulf, and Kansas Pacific R'ys, for Weston, St. Joseph, Junction City, Fort Scott, Lawrence, Topeka, Sheridan, Denver, Fort Union, Santa Fe, and

ALL POINTS WEST!

At SEDALLA, WARRENSBURG and PLEASANT HILL, with Stage Lines for Warsaw, Quincy, Bolivar, Springfield, Clinton, Osceola, Lamar, Carthage, Granby, Neosho, Baxter Springs, Fort Gibson, Fort Smith, Van Buren, Fayetteville, Bentonville.

PALACE SLEEPING CARS on all NIGHT TRAINS.

Baggage Checked Through Free!

THROUGH TICKETS for sale at all the Principal Railroad Offices in the United States and Canada. Be Sure and Get your Tickets over the PACIFIC R. R. OF MISSOURI.

W. B. HALE,
 Gen. Pass. and Ticket Agt.

THOS. McKISOCK,
 General Superintendent.

Hours the Quickest, and Sixty-One Miles the Shortest Line!

— FROM —

CHICAGO TO NEW YORK.

Pittsburgh, Ft. Wayne & Chicago and Pennsylvania Central

IS THE ONLY ROUTE RUNNING

THREE DAILY LINES OF THROUGH DAY AND SLEEPING CARS,

— FROM CHICAGO TO —

Harrisburg, Philadelphia and New York,

WITHOUT CHANGE!

WITH BUT ONE CHANGE TO

BALTIMORE, PROVIDENCE, NEW HAVEN,

HARTFORD, SPRINGFIELD, WORCESTER AND BOSTON!

Trains Leave WEST SIDE UNION DEPOT, corner West Madison and Canal Streets, as follows:

LEAVE:	Mail.	Day Express.	Pacific Exp.	Night Exp.	VALPARIAN AG- COMMODITY LEAVES CHICAGO 4:00 P. M.
CHICAGO	4.30 A. M.	8.00 A. M.	4.45 P. M.	9.00 P. M.	
PLYMOUTH	9.01 "	11.25 "	8.80 "	3.00 A. M.	
FORT WAYNE	11.59 "	1.55 P. M.	11.39 "	6.00 "	
LIMA	2.25 P. M.	3.53 "	1.33 A. M.	8.30 "	
FOREST	3.53 "	4.49 "	2.40 "	9.40 "	
CRESTLINE	5.50 A. M.	6.30 "	4.25 "	12.05 P. M.	
MANFIELD	6.30 "	7.00 "	4.53 "	12.34 "	
ORRVILLE	9.05 "	8.52 "	6.43 "	2.27 "	
ALLIANCE	11.15 "	10.25 "	8.40 "	3.55 "	
ROCHESTER	2.05 P. M.	12.35 A. M.	10.52 "	6.02 "	
PITTSBURGH	3.50 "	2.10 "	12.35 "	8.74 "	5.30 A. M.
BLAIRSVILLE BRANCH	6.05 "	4.20 "	2.49 P. M.	9.54 "	7.25 "
JOHNSTOWN	6.56 "	5.06 "	3.37 "	10.42 "	8.10 "
CRESSON	7.58 "	6.08 "	4.38 "	11.43 "	9.04 "
ALTOONA	9.05 "	7.15 "	5.45 "	12.35 A. M.	10.05 "
HUNTINGDON	10.21 "	8.26 "	7.04 "	1.45 "	11.14 "
LEWISTOWN	11.44 "	9.41 "	8.23 "	2.59 "	12.35 P. M.
HARRISBURG	2.10 A. M.	12.10 P. M.	10.45 "	5.30 "	2.50 "
LANCASTER	3.40 "	1.35 "	12.15 A. M.	6.42 "	4.10 "
DOWNTOWN	5.00 "	2.55 "	1.40 "	8.12 "	5.35 "
ARRIVE:					
PHILADELPHIA	6.30 "	4.15 "	3.00 "	9.30 "	6.50 "
NEW YORK, VIA PHILADELPHIA	10.41 "	7.45 "	6.43 "	1.00 P. M.	10.36 "
NEW YORK, VIA ALLIANCE		6.35 "		12.05 P. M.	
BALTIMORE		3.40 "	2.20 "	9.00 A. M.	7.00 "
WASHINGTON		6.30 "	5.50 "	1.00 P. M.	10.00 "
BOSTON		9.00 P. M.	5.50 A. M.	5.05 P. M.	11.50 "

THE DAY EXPRESS Leaves Chicago daily, except Sunday; has SILVER PALACE CARS from Chicago to New York, via Allentown, except Saturday; leaves Pittsburgh daily, except Sunday; has SLEEPING CAR from Crestline to Altoona, except Saturday. This train reaches NEW YORK one and a half hours in advance of all other lines, and in time to make close connection for BOSTON! No other Route through New York makes it! Arrives in BALTIMORE Five Hours, and WASHINGTON Four Hours in Advance of Rival Routes!

THE PACIFIC EXPRESS Leaves Chicago and Pittsburgh daily, for Philadelphia and New York, with THROUGH SILVER PALACE CARS from Chicago; leaves Harrisburg for Baltimore daily, except Sunday; has SLEEPING CARS from Chicago to Pittsburgh, and from Altoona to Philadelphia. This train arrives in NEW YORK One Hour, BALTIMORE Nine Hours, and WASHINGTON Seven Hours, in Advance of all other Lines!

THE NIGHT EXPRESS Leaves Chicago daily, except Saturday and Sunday; leaves Pittsburgh daily, except Sunday; leaves Harrisburg for Baltimore daily; has SILVER PALACE CARS on Tuesday, Wednesday and Friday; COMPARTMENT CAR on Monday and Thursday from Chicago to Philadelphia and New York; has SLEEPING CARS from Chicago to Crestline, and from Pittsburgh to New York, Philadelphia and Baltimore. This train reaches NEW YORK One Hour, and BALTIMORE Three Hours in Advance of competing Routes!

THE MAIL Leaves Chicago daily, except Sunday, stopping at all Stations, and reaching Crestline the same evening (where passengers can transfer to Day Express); leaves Crestline (Express) the next morning, and leaves Pittsburgh daily, except Sunday. SLEEPING CARS from Pittsburgh to Philadelphia.

THE SOUTHERN EXPRESS Leaves PITTSBURGH daily, except Monday, with SILVER PALACE CARS to Philadelphia and New York; leaves Harrisburg for Baltimore daily, except Sunday.

BOSTON AND NEW ENGLAND PASSENGERS will find this Route especially Desirable, as it Gives them an opportunity of Seeing the FINEST VIEWS AMONG THE ALLEGHANY MOUNTAINS,

Besides Visiting PITTSBURGH, PHILADELPHIA and NEW YORK, without extra cost!

All New England Passengers holding Through Tickets, will be Transferred, with their Baggage, to Rail and Boat Connections in NEW YORK, WITHOUT CHARGE.

Close Connections Made at Lima for all Points on the Dayton & Mich. and Cin., Hamilton & Dayton R's,

And at CRESTLINE, for CLEVELAND, ERIE, DUNKIRK, BUFFALO, NIAGARA FALLS, and all Points reached via Lake Shore R. R.

THROUGH TICKETS FOR SALE AT THE COMPANY'S OFFICES, N.W. COR. RANDOLPH & LA SALLE ST.,

65 and 52 Clark St., Cor. Randolph and Wells St., (under the Briggs House), and at Depot, Chicago; also at Principal Ticket Offices in the West.

F. R. MYERS, Gen. Pass. and Ticket Agt, P. & F. W. R'y, Chicago. W. C. CLELAND, Gen. Western Pass. Agt, P. Ft. W. & C. R'y, Chicago.

T. L. KIMBALL, Gen. Western Pass. Agent, Penn. Central R. R., Chicago.

NEW YORK AND BOSTON!

— VIA —

ALLENTOWN LINE.

THE ONLY LINE

Running Through Silver Palace Cars on Morning Trains from Chicago,

Via PITTS., FT. WAYNE & CHICAGO RY & ALLENTOWN LINE.

TWO EXPRESS TRAINS LEAVE CHICAGO VIA ALLENTOWN LINE,

On the Arrival of Trains from the West and South, as follows:

8:00 A. M. 9:00 P. M.

Sat. & Sun. Excepted.

Sat. & Sun. Excepted.

PASSENGERS SHOULD SEE THAT THEIR TICKETS ARE VIA ALLENTOWN, and SAVE 60 to 100 MILES TRAVEL!

THE SHORTEST LINE TO NEW YORK!

BAGGAGE CHECKED THROUGH!

FOR TICKETS and Information, apply at the Office, 52 Clark Street, under the Sherman House. SLEEPING CAR APARTMENTS and Time Tables furnished.

ROBT ENNETT,
Western Pass. Agent, 52 Clark St.,
CHICAGO.

H. P. BALDWIN,
General Pass. Agent, 119 Liberty St.,
NEW YORK.

Broad Gauge! Double Track!

ERIE RAILWAY.

4 EXPRESS TRAINS DAILY!

From Cleveland, Dunkirk and Buffalo, 625 Miles, to New York, WITHOUT CHANGE of Coaches!

The Trains of this Railway are run in DIRECT CONNECTION WITH ALL WESTERN AND SOUTHERN LINES, for

Elmira, Williamsport, Oswego, Great Bend, Scranton, Newburgh!

NEW YORK, ALBANY, BOSTON, PROVIDENCE,
AND PRINCIPAL NEW ENGLAND CITIES.

New and Improved DRAWING ROOM COACHES are attached to the DAY EXPRESS Running THROUGH TO NEW YORK.

SLEEPING COACHES, Combining all Modern Improvements, with perfect Ventilation and the peculiar arrangements for the comfort of Passengers incident to the BROAD GAUGE, accompany all night trains to New York.

CONNECTIONS CERTAIN! as Trains on this Railway will, when necessary, wait from one to two hours for Western trains.

All Trains of Saturday run directly Through to New York.

Ask for Tickets via Erie Railway, which can be procured at 66 Clark Street, Chicago, and at all Principal Ticket offices in the West and Southwest.

L. D. RUCKER, A. J. DAY, WM. R. BARR,
Gen'l Superintendent, New York. | Western Passenger Agent, Chicago. | Gen'l Passenger Agent, New York.

LAKE SHORE — AND — MICHIGAN SOUTHERN R.W.

THE GREAT THROUGH LINE BETWEEN
CHICAGO, BUFFALO & NEW YORK,
WITHOUT CHANGE!

AND THE ONLY RAILWAY

RUNNING PALACE COACHES THROUGH!

— BETWEEN —

CHICAGO & NEW YORK, via BUFFALO

WITHOUT TRANSFER OF PASSENGERS!

All Trains Stop at Twenty-Second Street to Take and Leave Passengers.
Baggage Checked at that Station for all Points East.

4 EXPRESS TRAINS DAILY, [Sundays Excepted,] Leave
Chicago from the New Depot, on Van Buren St., at the head of La Salle Street, as follows:

6:00 A. M. MAIL TRAIN.
VIA OLD ROAD. SUNDAYS EXCEPTED.

Leaves 22d Street 6:15 A. M. Stops at all Stations. Arrives—Toledo, 4:40 P. M.

8:00 A. M. SPECIAL NEW YORK EXPRESS
VIA OLD ROAD. SUNDAYS EXCEPTED.

Leaves—Twenty-Second Street, 8:15 A. M. Arrives—Elkhart, 11:50 A. M. (Stops 20 minutes for Dinner); connects with Air Line Mail Train, leaving Elkhart, 12:01 P. M., stopping at all Stations on Air Line Division between Elkhart and Toledo, connecting at Toledo with Special New York Express 5:10 P. M.; arrives at Cleveland 9:20 P. M.; Buffalo, 3:40 A. M.; New York, 8:00 P. M.; Boston, 11:45 P. M.

This Train has PALACE SLEEPING COACH Attached, Running
THROUGH TO ROCHESTER, WITHOUT CHANGE!

IN DIRECT CONNECTION WITH

Wagner's Celebrated Drawing-Room Coaches on N. Y. Central R. R.

4:45 P. M. ATLANTIC EXPRESS (Daily),
VIA AIR LINE.

Leaves—Twenty-Second Street 5:00 P. M. Arrives—Laporte, 7:25 P. M. (Stops 20 minutes for Supper); arrives at Toledo, 2:30 A. M.; Cleveland, 7:15 A. M. (30 minutes for Breakfast); arrives at Buffalo, 1:05 P. M.; Rochester, 5:10 P. M. (30 minutes for Supper); connects with Sleeping Coach running through from Rochester to Boston without Change, making but One Change between Chicago and Boston.

NEW AND ELEGANT SLEEPING COACH Attached to this Train, Running
THROUGH from CHICAGO TO NEW YORK WITHOUT CHANGE! Arrives
at NEW YORK, 7:00 A. M.

9:00 P. M. NIGHT EXPRESS
VIA OLD ROAD. (DAILY EXCEPT SAT. & SUN.)

Leaves—Twenty-Second Street, 9:12 P. M. Arrives—Toledo, 6:35 A. M. (30 minutes for Breakfast); arrives at Cleveland, 11:20 A. M.; Buffalo, 6:30 P. M.; New York, 1:00 P. M.; Boston, 3:50 P. M.

KALAMAZOO DIVISION.

Leave Chicago 8:00 A. M. Arrive at Kalamazoo 3:15 P. M.;
Grand Rapids, 6:30 P. M.

Leave Chicago 9:00 P. M. Arrive at Kalamazoo 4:40 A.
M.; Grand Rapids, 8:15 A. M.

There being no heavy grades to overcome, or mountains to cross, the road bed and track being the smoothest and most perfect of any railway in the United States, this Company run their trains at a high rate of speed with perfect safety.

Travelers who wish to SAVE TIME and make SURE CONNECTIONS, purchase Tickets via

LAKE SHORE & MICHIGAN SOUTHERN R'Y.

THE ONLY LINE RUNNING THROUGH BETWEEN CHICAGO AND
BUFFALO, WITHOUT TRANSFER, and in Direct Connection with NEW YORK
CENTRAL RAILROAD and ERIE RAILWAY.

General Ticket Office for Chicago, No. 56 Clark Street.

CHAS. F. HATCH,
General Superintendent, CLEVELAND, OHIO.

F. E. MORSE,
General Western Passenger Agent, Chicago.

ILLINOIS CENTRAL RAILROAD.

PASSENGER TRAINS LEAVE CHICAGO FROM THE GREAT CENTRAL DEPOT, FOOT OF LAKE ST

ST. LOUIS AND CHICAGO THROUGH LINE.

8:30 A. M. DAY EXPRESS, Sundays Excepted.
Arriving in ST. LOUIS at 9:30 P. M.

This Train Reaches St. Louis ONE HOUR & FIFTEEN MINUTES in Advance of any other Route!

9:30 P. M. FAST LINE, Saturdays Excepted.
Arriving at ST. LOUIS at 10:30 A. M.

AT ST. LOUIS, Direct Connections are Made FOR

Jefferson City, Sedalia, Pleasant Hill, Macon, Kansas City,
LEAVENWORTH, ST. JOSEPH & ATCHISON,

—Connecting at KANSAS CITY for—

LAWRENCE, TOPEKA, JUNCTION CITY, SALINA, SHERIDAN, &c.

CAIRO, MEMPHIS AND NEW ORLEANS LINE.

8:30 A. M. CAIRO MAIL, Sundays Excepted.
Arriving at Cairo 2:21 A. M., Memphis 12:40 P. M., Mobile 9:40 A. M., Vicksburg 9:30 A. M., New Orleans 11:10 A. M.

9:30 P. M. CAIRO EXPRESS, Except Saturdays.
Arriving at Cairo 3:15 P. M., Memphis 2:30 A. M., Vicksburg 5:00 P. M., New Orleans 1:30 A. M.

4:50 P. M. CHAMPAIGN PASSENGER,
Arriving at Champaign at 11:00 P. M.

THIS IS THE ONLY DIRECT ROUTE TO

Humboldt, Corinth, Grand Junction, Little Rock, Selma, Canton,
Grenada, Columbus, Meridian, Enterprise,

MEMPHIS, VICKSBURG, NEW ORLEANS & MOBILE.

At NEW ORLEANS, connections are made for

GALVESTON, INDIANOLA,

And all Parts of Texas.

NOTICE.—This Route is from 100 to 150 MILES SHORTER, and from
12 to 24 HOURS QUICKER than any other.

THIS IS ALSO THE ONLY DIRECT ROUTE TO

DECATUR, TERRE HAUTE, VINCENNES & EVANSVILLE.

Peoria and Keokuk Line.

8:30 A. M. KEOKUK PASSENGER, Sun. Ex.
Arriving at Chenoa 3:15 P. M., El Paso 4:05 P. M., Peoria 6:40 P. M., Canton 7:14 P. M., Bushnell 8:59 P. M., Keokuk 11:26 P. M., Warsaw 12:05 A. M.

9:30 P. M. KEOKUK PASSENGER,
On Saturdays, this Train will leave at 4:50 P. M. Arriving at Chenoa 3:35 A. M., El Paso 4:25 A. M., Peoria 6:05 A. M., Canton 7:36 A. M., Bushnell 9:25 A. M., Keokuk 12:05 P. M., Warsaw 12:40 P. M.

THIS IS THE DIRECT ROUTE TO

PEORIA, CANTON, KEOKUK, CHATSWORTH, FAIRBURY,
CHENOA, EL PASO, BUSHNELL, HAMILTON, & WARSAW.

Connecting at PEORIA for

PEKIN, HAVANA, BATH AND VIRGINIA.

—CONNECTING AT KEOKUK FOR—

Ottumwa, Eddyville, Oskaloosa, Pella, Monroe, Des Moines.

Elegant Drawing Room Sleeping Cars

ATTACHED TO ALL NIGHT TRAINS.

SPACIOUS AND FINE SALOON CARS, with all Modern Improvements,
Run upon all Trains.

BAGGAGE CHECKED THROUGH TO ALL IMPORTANT POINTS.

For Through Tickets, Sleeping Car Berths, Baggage Checks, and information, apply at the office
of the Company in the Great Central Depot, foot of Lake St.

Hyde Park and Oakwoods Train.

HYDE PARK TRAIN, (LEAVE) 8:05 A. M.	(ARRIVE) 7:45 A. M.	HYDE PARK TRAIN, (LEAVE) 3:00 P. M.	(ARRIVE) 5:15 P. M.
HYDE PARK TRAIN, (LEAVE) 8:05 A. M.	(ARRIVE) 9:13 A. M.	HYDE PARK TRAIN, (LEAVE) 6:10 P. M.	(ARRIVE) 7:35 P. M.
HYDE PARK TRAIN, (LEAVE) 12:10 P. M.	(ARRIVE) 1:40 P. M.		

* Sundays Excepted.

W. P. JOHNSON, Gen. Pass. Agent.

M. HUGHITT, Gen. Supt.

1870. Great Central Route! 1870.

SPEED! COMFORT! SAFETY!

MICHIGAN CENTRAL and GREAT WESTERN RAILWAYS!

The Great Central Route, via Niagara Falls, to

NEW YORK AND NEW ENGLAND.

Pullman's Magnificent Palace Drawing-Room Cars,

— FROM —

CHICAGO TO NEW YORK CITY, WITHOUT CHANGE.

4 PASSENGER TRAINS LEAVE CHICAGO, DAILY EXCEPT SUNDAY.
(DEPOT, FOOT OF LAKE STREET,) as follows:

5:00 A. M. MAIL TRAIN. Stops at all Stations.
(SUNDAYS EXCEPTED.) Arrives DETROIT at 5:50 P. M.

8:00 A. M. SPECIAL NEW YORK & BOSTON EXP.
(SUNDAYS EXCEPTED.) Arrives at Michigan City 10:15, New Buffalo 10:30, Niles 11:25, Kalamazoo 1:00 P. M.; Battle Creek 1:45, Marshall 2:15, [Dinner], Jackson 3:40, Detroit 6:30, London 11:15, Hamilton 3:00 A. M.; Toronto 9:20, Suspension Bridge 3:35, Rochester 6:50 A. M.; Albany, 2:40 P. M.; NEW YORK, 7:30, BOSTON, 11:50 P. M. This train connects at ROCHESTER (7:00 A. M.) with

Wagner's Magnificent Palace Drawing-Room Cars!

— RUNNING THROUGH TO NEW YORK, WITHOUT CHANGE! —

4:45 P. M. ATLANTIC EXPRESS.
(DAILY.) Arrives at Michigan City, 7:00 P. M.; Niles 8:15 P. M. [Supper]; Kalamazoo, 10:25 P. M.; Jackson, 1:00 A. M.; Detroit 3:40, London, 8:35, [Breakfast]; Hamilton 11:50, Suspension Bridge 1:30 P. M.; Rochester 5:10 P. M.; Albany, 1:50 A. M.; NEW YORK, 7:00 A. M.; BOSTON, 11:00 A. M. A MAGNIFICENT DRAWING-ROOM SLEEPING CAR is attached to this train daily, FROM CHICAGO TO NEW YORK CITY. The celebrated

Hotel Drawing-Room Car is also attached to this Train from Chicago to Rochester!

These, together with ELEGANT DAY CARS TO SUSPENSION BRIDGE, make this Train the favorite Train for all points East.

SPECIAL NOTICE.—Boston and New England Passengers will please notice that this Train now makes direct connection through. A SLEEPING CAR is attached at Rochester at 5:30 P. M., running through to Springfield, Mass., thus avoiding transfer at Albany. Breakfast at Springfield. This Train reaches Springfield early enough second morning to Connect with all Trains up and down the Connecticut.

9:00 P. M. NIGHT EXPRESS.

(SAT. & SUN. EXCEPTED.) Arrives at Michigan City, 11:15 P. M.; Niles, 12:45 A. M.; Kalamazoo, 2:25; Marshall, 3:45; Jackson, 5:10; Grand Trunk Junction, 8:05; Detroit, 8:30; London, 1:45 P. M.; Hamilton, 4:35; Toronto, 9:35; Niagara Falls, 6:15; Buffalo, 7:15 P. M.; Rochester, 9:10; Syracuse, 12:25 A. M.; Rome, 1:55; Utica, 2:25; Albany, 6:30 A. M.; NEW YORK, 12:45 P. M.; BOSTON, 3:40 P. M.

PULLMAN'S PALACE SLEEPING CARS ARE ATTACHED TO THIS TRAIN FROM CHICAGO TO DETROIT,
And from Suspension Bridge to New York.

WE INVITE THE ATTENTION OF THE TRAVELER to the SPLENDID EQUIPMENTS of this FIRST-CLASS LINE TO THE EAST!

FOR THROUGH TICKETS, and any and all information, Sleeping Car accommodations, &c., apply at General Office in Tremont House Block, at office in Great Central Depot; also at No. 60 Clark street, under Sherman House; at Grand Trunk Railway Office, 48 Clark street, or at New York Central Railroad Office, No. 53 Clark street, and at office under Briggs House.

H. E. SARGENT, Gen. Supt. M. C. R. R.

W. K. MUIR, Gen. Supt. Gt. Western R. W.

HENRY C. WENTWORTH, Gen. Pass. Agt.

CHICAGO, INDIANAPOLIS & LOUISVILLE THROUGH LINE!

— VIA —

VIA MICHIGAN CENTRAL RAILROAD.

THE ONLY ROUTE TO

TO LOUISVILLE, WITHOUT CHANGE OF CARS.

TWO EXPRESS TRAINS Leave Chicago Depot, Foot of Lake as follows:

8:00 A. M. MORNING EXPRESS.
(EXCEPT SUNDAY.) Arriving at LaFayette, 2:35 P. M.; Indianapolis, 6:00 P. M.; Louisville, 11:30 P. M.

4:00 P. M. AFTERNOON EXPRESS.
(EXCEPT SATURDAY) Arriving at Michigan City 6:30 P. M. [Supper]; LaFayette, 11:30 P. M.; Indianapolis, 2:15 A. M.; Louisville, 7:00 A. M.; Nashville, 4:00 P. M.

A GOOD SLEEPING CAR is Attached to this Train Every Night,
And goes from Chicago to Louisville WITHOUT CHANGE!

SPECIAL NOTICE.—This Train stops at Michigan City for Supper, and waits at that point for Michigan Central Atlantic Express East, leaving Chicago at 4:45 p. m. Passengers going South, and wishing as much time in Chicago as possible, can take the 4:45 p. m. Michigan Central Atlantic Express, and connect without fail at Michigan City, with above Through Louisville Express.

THE GREAT BRIDGE ACROSS THE OHIO at Louisville being completed, passengers are relieved of the omnibus transfer.

FOR THROUGH TICKETS, via this line, apply at offices of connecting lines and at all ticket offices in Chicago.

HENRY C. WENTWORTH, Gen. Pass. Agent,

Michigan Central R. R. LOCAL CONNECTIONS:

Chicago & Michigan Lake Shore Railroad.

Open from New Buffalo to St. Joseph, Mich.

8:00 A. M. AND 4:00 P. M. Trains from Chicago Connect at New Buffalo.

Kalamazoo, Allegan & Grand Rapids R. R.

Open to Grand Rapids.

8:00 A. M. AND 9:00 P. M. Trains from Chicago Connect at Kalamazoo.

Peninsular Railroad of Michigan.

Open to Charlotte.

8:00 A. M. AND 9:00 P. M. Trains from Chicago Connect at Battle Creek.

Jackson, Lansing & Saginaw Railroad.

Open to Bay City, Mich. Passing through Lansing and Saginaw.

8:00 A. M. AND 9:00 P. M. Trains from Chicago Connect at Jackson.

GRAND TRUNK RAILWAY.

All Michigan Central Trains Connect at Grand Trunk Junction

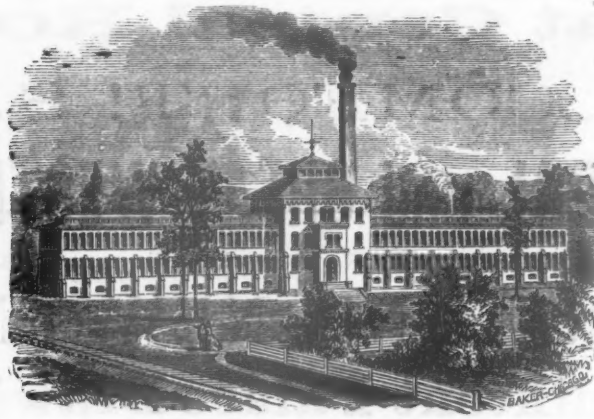
— FOR —

SARNIA, TORONTO, MONTREAL,
PORTLAND, BOSTON, BUFFALO, OGDENSBURG

AND ALL POINTS EAST

H. E. SARGENT, General Superintendent.

Elgin Watches!



Elgin Watches!



MANUFACTURED BY

THE NATIONAL WATCH COMP'Y.

OFFICE GEN'L SUP'T U. P. R. R. }
OMAHA, Neb., Dec. 16, 1869. }

HON. T. M. AVERY, President National Watch Co.,
Chicago, Ill.

Dear Sir—During the months that I have carried one of your B. W. Raymond Watches, it has not failed to keep the time with so much accuracy as to leave nothing to desire in this regard.

For accuracy in time keeping, beauty of movement and finish, your watches challenge my admiration and arouse my pride as an American, and I am confident that in all respects they will compete successfully in the markets of the world with similar manufactures of older nations. They need only to be known to be appreciated.

Yours, most respectfully,
C. G. HAMMOND, Gen. Sup't.

OFFICE OF GEN'L SUP'T H. R. R. R. }
NEW YORK, Jan. 17, 1870. }

M. AVERY, Esq., President National Watch Co.

Dear Sir—The Watch made by your Company, which I have carried the past two months, has kept excellent time. I have carried it frequently on engines, and have been on the road with it almost daily. During this time it has run uniformly with our standard clock. Truly yours,

J. M. TOUCEY.

PENN'A R. R. Co., GEN. SUP'T. OFFICE, }
ALTOONA, Jan. 19, 1870. }

T. M. AVERY, Esq., President National Watch Co.,
Chicago.

Dear Sir—This Company has purchased and put in the hands of its engine-men, eighty "Raymond movements," which have given excellent satisfaction and proved to be very reliable time-keepers. In addition to these, quite a number of Elgin Watches have been purchased by officers and employees of this Company, all of whom have been well pleased with the efficiency and regularity of the movements manufactured by the National Watch Company. Respectfully,

EDWARD H. WILLIAMS,
General Superintendent.

AMERICAN MERCHANTS' UNION EXPRESS Co. }
CHICAGO, Feb. 17, 1870. }

T. M. AVERY, Esq., President National Watch Co.,
Chicago, Ill.

Dear Sir—It gives me pleasure to state that the two or three Elgin Watches I have at different times purchased for presentation have given entire satisfaction, and are highly valued as elegant and correct time-keepers.

A very large number of your Watches are being carried by the Messengers in the employ of this Company, and are giving entire satisfaction, their time-keeping qualities being implicitly relied upon. CHAS. FARGO.

MICHIGAN CENTRAL R. R. Co. }
CHICAGO, Jan. 15, 1870. }

T. M. AVERY, Esq., President National Watch Co.:

Dear Sir—I have now been carrying one of your Elgin Watches, of the B. W. Raymond pattern, for nearly five months, and it affords me much pleasure to testify in favor of its time-keeping qualities, in which, after this length of time, I have great confidence. It has from the first run very close to the standard time, the slight variation being uniform, and susceptible of correction by careful regulation. My experience thus far justifies the opinion that it is a very safe and reliable time-keeper.

Respectfully yours, H. E. SARGENT.

OFFICE OF THE GEN. SUP'T. C. & N. W. R'y. }
CHICAGO, Feb. 16, 1870. }

T. M. AVERY, Esq., President National Watch Co.:

Dear Sir—I have pleasure in expressing my opinion of the Elgin Watches, the more so since I do not think there is a better watch made. A large number of them are in use by our conductors and engine-men, and other employees, and I have heard no dissenting opinion upon their merits. They run with a smoothness and uniformity fully equal to any other watch I know of, and justify all your claims of excellence in manufacture and fitting of parts. Yours, truly,

GEO. L. DUNLAP, Gen'l Sup't.

LAKE SHORE & MICHIGAN SOUTHERN R. R. }
CHICAGO, Jan. 27, 1870. }

T. M. AVERY, Esq., President National Watch Co.:

Dear Sir—I have carried the Elgin Watch long enough to be able to pronounce it a first-rate time-keeper. I am making a very careful test of its performance and will soon give you the results. I think it will show that the West can produce Watches equal to the manufacture of any part of the world. Yours, truly,

E. B. PHILLIPS,
President L. S. & M. S. R. R. Co.

OFFICE GEN. SUP'T ERIE RAILWAY, }
NEW YORK, Feb. 7, 1870. }

T. M. AVERY, Esq., President National Watch Co.,
Chicago, Ill.:

Dear Sir—Having for about three months tested, in various ways, the "time-keeping" qualities of one of your Elgin Watches, I most cheerfully award it the praise that it is due. For one month the Watch was carried by one of our Locomotive Engineers, and since by different persons, so that its full value as a time-keeper could be known under different modes of treatment. I will simply say that it has given perfect satisfaction, and in my opinion is as near perfection as I believe it possible a Watch can be made. Respectfully yours,

L. H. RUCKER,
General Superintendent.

No Movements Retained }
by the Company.

Business Office and Salesroom of the National Watch Company, Nos. 159 and 161 Lake Street, Chicago.

R. R. OFFICE CLERKS' Mutual Life Insurance Association, OF THE UNITED STATES.

CHICAGO, Ill., March 21, 1870.

The annual meeting of the Association, for the election of officers, revising the constitution, &c., will be held at Chicago, Ill., at 7 1/4 p. m., Tuesday, April 19, 1870, at the Tremont House.

In addition to the one delegate from each railroad (as provided by the constitution), an invitation is extended to all members who can, to be present, as a thorough revision of the constitution is desired, and other matters of importance will be considered.

Delegates and other members on their arrival will please report to the Committee of Arrangements at the Tremont House, between the hours of 3 and 5 p. m., April 12.

All delegates and others will confer a favor by informing me, by mail, on receipt of this, of their intention to attend the meeting; and those delegates unable to attend will please appoint some one to represent them, or forward their proxy by mail.

Any railroad agent, paymaster, passenger and ticket agent, and clerk of railroad or transportation company, not now a member, can become so by forwarding their names and initiation fee (\$2.00) to R. D. KEEN, Secretary, box 220, Bordentown, N. J., or to me, or by applying as above to the committee on the 12th inst.

J. G. NEIL, President.
Office P. C. & St. L. R. R., corner Carroll and Halsted Sts., Chicago.

BLISS, TILLOTSON & CO.,

Manufacturers and Dealers in

TELEGRAPH MACHINERY,

—AND—

SUPPLIES

Of Every Description.

247 South Water Street,
CHICAGO, ILL.

L. G. TILLOTSON & CO., N. Y. | G. H. BLISS, CHICAGO.

F. E. Canda, BRIDGE BUILDER.

—AND—

GENERAL CONTRACTOR.

No. 2 S. Clark St.,

CHICAGO.

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—TO—

The Western News Company,

CHICAGO.

THE AMERICAN BUILDER,

AND JOURNAL OF ART.

CHICAGO.

A PAPER FOR EVERYBODY.

Every Architect, Builder and Mechanic should have it.

Its pages contain the best and most original designs, fully illustrated; and adapted for general use.

The original articles that appear in each number of THE BUILDER, together with its Original and Beautiful Designs for

Cottages and Residences,

make it worth many times its subscription price.

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CHAS. D. LAKEY,
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THE ARTS.

THE NEW MONTHLY,

DEVOTED TO POPULAR SCIENCE.

Profusely illustrated, containing excellent lithographs of prominent scientific men, is published at the very low price of

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The list of its eminent contributors embraces such men as Prof. Joy, Prof. Heinrich, Dr. N. S. Davis, Dr. E. Andrews, and others of world-wide fame, who are a guarantee for the excellence of the journal.

Address for the same

J. M. HIRSH & CO.,
10 and 12 S. Wells St., Chicago.

THE RAILROAD GAZETTE.

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